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DELAWARE RIVER DIVERSION CASE

IN THE

Supreme Court of the United States

OCTOBER TERM, 1930.

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STATE OF NEW JERSEY,

Plaintiff,

vs.

STATE OF NEW YORK and CITY OF NEW YORK,

Defendants.

COMMONWEALTH OF PENNSYLVANIA,

Intervener.

On Exceptions to the Report of the Special Master.

PLAINTIFF'S REPLY BRIEF

APRIL 13, 1931.

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PLAINTIFF'S REPLY BRIEF.

This brief is a reply to the briefs filed in behalf of the State of New York and of the City of New York.

Summary.

I.

The doctrine of equitable apportionment does not apply.

II.

The evidence shows that substantial damages would be caused to the plaintiff and its citizens by the proposed diversion.

III.

The decree should be final.

I.

The doctrine of equitable apportionment does not apply.

This is the converse of the statement that the common law rule of riparian rights does apply under the facts of this case. The reasons in support of this conclusion have been presented in our main brief under Point I entitled, "Riparian Rights under Common Law," at pages 24 to 63.

The briefs both of the City and of the State rely chiefly on the case of *Connecticut* v. *Massachusetts*, No. 9 U. S. Adv. Opinions, 1930, page 297, which has been discussed and distinguished at pages 54 to 59 of our main brief.

We show in our main brief (p. 43) that the doctrine of equitable apportionment is an attribute of the appropriation rule and has no relation to the common law rule of riparian rights. An equitable apportionment of water under the appropriation rule is incapable of causing legal damages to the owners of other riparian rights. The conclusion of the Master that the doctrine of equitable apportionment should apply and that damages should be considered in such a case, creates a novel situation. He states (italics ours): "adding all of these elements of damage together gives a total of substantial damage and, in my opinion, more than New Jersey should be expected to bear *under the principle of fair and equitable apportionment.*"

In cases to which the principle of equitable apportionment applies, there is no question of damages; conversely, in cases where the principle of riparian rights applies, the question of damages is of the first importance.

The brief of the City argues that under the doctrine of equitable apportionment, the diversion of 600 million gallons per day does not exceed the fair share of the State of New York in the waters of the Delaware River (pages 25 to 30).

The City relies chiefly upon the so-called Compacts, which have already been discussed in plaintiff's main brief (page 60). It is unnecessary to add to that discussion. It would be strange indeed if the opinions of individuals appointed to negotiate, but not to conclude, a treaty could outweigh the constitutional authority of the legislature of the state, which repeatedly rejected their recommendations, after deliberate and protracted hearings.

II.

The evidence shows that substantial damages would be caused to the plaintiff and its citizens by the proposed diversion.

The Master in his Report has discussed the evidence as to the various items of damage alleged by the plaintiff; in some cases he finds there would be slight damage, in others, that there would be substantial damage.

In our main brief we have discussed certain of these items of damage, to wit:

Navigation, pages 111 to 140;
Water Power, pages 147 to 169;
Industrial Uses, pages 169 to 185.

In that discussion we have attempted to show that the Master's conclusions that the New York plan would have only slight effect upon said items, were erroneous, and that they would suffer substantial damage.

The defendants, in their briefs, argue that the conclusions of the Master that the New York plan would cause substantial damage to certain items, to wit, recreation and oysters, are erroneous; and they further argue that his conclusions are likewise erroneous even as to those items concerning which he found only slight damage, in that they say there was no damage whatever.

In this reply we will consider first, the items concerning which the Master found substantial damage, and, second, those concerning which he found slight damage (other than those already covered in the main brief).

Suing in its character of *parens patriae* plaintiff does not undertake to, and, indeed, cannot, prove circumstantially the damages which each of its citizens may suffer by reason of the proposed diversion. It can, and does, deal with the subject in a comprehensive and general way. Hence it shows substantial, rather than circumstantial, damages, and the damages which it proves are but an infinitesimal part of the probable aggregate damage to its citizens.

Elements of Substantial Damage.

The Special Master found substantial damage to recreational uses of the river and to the oyster industry.

(a)

Recreation.

The allegations of the complaint respecting injuries to the recreational uses of the river are set forth in the Special Master's report (R. 4894). He found that the allegations of paragraph 31 are sustained by the proof and, with respect to paragraph 32, that lands and improvements along the river in New Jersey used for pleasure and recreational purposes are valued in excess of the sum of $11,000,000 (R. 4894); that the river has an excellent reputation as a place for pleasure and recreational purposes, the impairment of which would be very damaging to the summer hotels, boarding houses, bungalows and camps which depend on that class of business; that summer rises and freshets produced by sudden or heavy rainfall, while increasing temporarily, by washings from the land, the degree of the pollution and turbidity of the

stream, improve the condition of the river and that a moderate rise in the river, particularly in low flows, is helpful for boating and bathing (R. 4896).

The Master found that the proposed releases under the New York plan will add to the natural flow of the river less water than would exist under natural conditions (R. 4900). His conclusion was that not only the condition, but also the reputation, of the river as the place of recreation is important and should not be measurably impaired, and that the execution of the New York plan will at times appreciably impair the use of the river for recreational purposes (R. 4002).

These findings are the subject of exceptions by the defendant city and the defendant state.

Plaintiff filed no exception to this finding for the reason that it was favorable to its contentions.

The Effect of Diversion at Tri-State Rock.

The summer season for recreational purposes extends from June 1 to about September 15 (R. 1194).

If the New York plan had been in operation during the years mentioned, the average diversion, allowing for releases, for the summer season of 1914 at Tri-State Rock would have been 4.1 per cent.; in 1915, 17.2 per cent.; in 1916, 11.5 per cent.; in 1917, 12.1 per cent.; in 1918, 8.4 per cent.; in 1919, 16.2 per cent.; in 1920, 16.9 per cent.; in 1921, 10.8 per cent.; in 1922, 9.6 per cent.; in 1923, 7.0 per cent.; in 1924, 15.2 per cent.; in 1925, 8.4 per cent.; in 1926, 8.4 per cent.; in 1927, 14.9 per cent.; in 1928, 8.4 per cent., and in 1929, 4.6 per cent. The average flow before diversion, during July, August and September for the period 1914 to 1929 was 3,607 cubic feet per second. With diversion the flow would have been 3,195 cubic feet per second or a decrease of 11.4 per cent. (R. 1195).

Out of the total number of months during this period of 64 months, decrease would occur on 53 months. The number of months when an increase in flow would occur would be 10. The number of months when no decrease or increase would occur would be 1 (R. 1195; Exhibit No. 80). The New York plan will result in disadvantage to the recreational area below Tri-State Rock, even during the months of July, August, September and October, because the number of releases and the amount of release will not improve the present character of the stream to any appreciable degree, whereas the amount of diversion during these same months, during a considerable part of the past experience, will appreciably decrease the available dilution water (R. 1196; 1458, 1459).

On the record from 1913 to 1929 for the four summer months, defined as July, August, September and October, there would be an increase in those 66 months of about 14 of the 66, 21 per cent. in the 17 years. The increase on no occasion at that point exceeds 149 total c. f. s. The remaining 79 per cent. of those summer months showed decreases.

Of the 66 total months available, the increase due to the plan—all these figures restricted to the summer—between zero and 25 c. f. s. would be about three months of the 66. Between 26 and 50 would be zero. Between 51 and 75 c. f. s. three months. Between 76 and 100 three months. The remainder of those months would be between 101 and 150. 149 c. f. s. is the maximum in the record.

On the other hand, the decreases during the same months between zero and 25 would be two months. Between 26 and 50 would be three months. Between 51 and 75 would be two months (R. 1461).

Passing into the higher classification the decreases for the New York plan between 151 and 200 would be five months. Between 201 and 500 would be twelve months. Between 501 and 1,000 would be fifteen months. Between

1,001 and 2,000 would be eight months, and in excess of 2,001 one month.

In addition, for five out of the 66 months from 1913 to 1929 a gain by diversion; that is, the gain of regulated flow or release, would be higher than 100 c. f. s. and lower than 150 c. f. s. For 36 out of the 66 months the loss by diversion exceeds 200 c. f. s. For 45 out of the 66 months the loss exceeds 100 c. f. s. (R. 1461).

The above data show that the disadvantages of the New York plan during the summer months are greater by far than the slight advantages resulting from proposed releases. During the winter months only disadvantages result for the most part (R. 1461). The diversion plan, therefore, will result in injury to the river at Tri-State Rock the greater part of the time (R. 1197; 1462, 1463).

The number of days in which the natural flow of the Delaware River was less than 0.45 c. s. m. was 19 days in 1919, 44 in 1922, 4 in 1928, and 68 days in 1929. With the New York City plan of release the number of days resulting in flows less than 0.45 c. s. m. would either remain the same or be increased. Exhibits 300A and 300B. The situation with the Pennsylvania plan of release would be somewhat better, but would likewise result in some of the years in an increase of the number of days of flow less than 0.45 c. s. m. (R. 4231; Pennsylvania Exhibit No. 418).

The conclusion is, therefore, inevitable that the disadvantages of the New York plan during the summer months are greater by far than the slight advantages which would result from proposed releases. This being the case, as quantities of reasonably good water are removed from any cross-section of the stream, the concentration of organisms at that cross-section will increase. The diversion plan, therefore, will result in injury to the river at Tri-State Rock the greater part of the time (R. 1197; 1461, 1462, 1463; Exhibits Nos. 300 A and 300 B).

The net result of the operation of the New York City plan would be a decrease of the flow at points along the river from Tri-State Rock southward, during the summer months, July to October, inclusive. Specifically, as follows: at Tri-State Rock from 3,390 to 2,953 c. f. s. or 12.9%; at Belvidere from 5,326 to 4,887 c. f. s. or 8.3%; at Trenton from 6,105 to 5,685 c. f. s. or 6.8% (Exhibit 240).

After allowing for the proposed releases, on the average, the river stages would be reduced from May to October of each year as follows: At Tri-State Rock about 2 inches with a maximum as high as 8⅜ inches for an entire month; at Belvidere 3¼ inches, maximum 7⅞ inches (Exhibit 103).

On the basis of the record of flow from 1914 to 1929, inclusive, reductions in flow at Tri-State Rock would have occurred ranging from 4.1% to 17.2%, with an average decrease for the whole period of 11.4% (R. 1194).

The natural flow on the Delaware for strategic stations in the entire period of record where it is available and for the periods from July to October, inclusive, exceed 0.45 c. s. m. for about 70 per cent. of the time at Port Jervis, about 80 per cent. of the time at Belvidere, about 75 per cent. of the time at Riegelsville, and over 80 per cent. of the time at Trenton. So that a regulated plan which removes, or tends to remove, flows in excess of 0.45 does not give a condition preferable to the existing natural experience.

Benefit of Natural Variations of Flow.

Many witnesses testified to objectionable conditions which now occur in the river during low flow periods and that if there is any reduction of water in the summer it will seriously affect their enterprises and the recreational uses of the river. These witnesses also testified, from their

own experience of many years on the river, that the spring high waters not only do no damage but are a great value in cleaning out of the river debris, and sludge deposits in the river caused by sewage from Port Jervis, which accumulates in the river and which if not washed out by spring waters remain and become stagnant during the summer. Without going into details regarding this testimony, which comes from a great number of witnesses, we will merely refer to them. Rudolfs (R. 1197, 1198); Transue (R. 1247); Eilenberger (R. 1252, 3); Etter (R. 1269, 1270); Graves (R. 1476, 7); Feindt (R. 1882); Searles (R. 1924, 1925).

As to the magnitude and frequency of these summer rises and freshets and the extent to which they would be reduced and eliminated by New York City's plan of diversion, reference is made to Exhibit 300-N. That exhibit relates to conditions at Trenton but similar conditions pertain all along the river to Tri-State Rock. The following are examples of the elimination of summer rises available under natural conditions for flushing the river:

July 13-20, 1915, the flow would have been decreased at Trenton from an average of 10,619 to an average of 7,134 c. f. s. or a decrease for eight days of 3,485 c. f. s. or roundly 30%. On one day during this period the flow would have been reduced from 11,100 c. f. s. to 3,295 c. f. s., a decrease of 7,805 c. f. s. or a reduction of about 70% of the flow in the hottest midsummer weather.

August 26-30, 1915, the flow would have been decreased from 9,060 to 6,081 c. f. s. or a decrease of 2,979 c. f. s. or about 30%. On one day in this period the flow would have been decreased from 5,600 to 625 c. f. s., or 90%.

June 30 to July 6, 1917, a summer rise of 11,914 c. f. s. would have been cut down to 8,475 c. f. s. as an average for seven days, a reduction of 3,439 c. f. s. or around

30%, and a maximum reduction in the flow on one day from 16,400 to 10,050 c. f. s., a reduction of 6,350 c. f. s. or nearly 40% of the maximum.

These are merely three examples out of dozens given on Exhibit 240 and similar examples occur in midsummer for longer or shorter periods in almost every one of the years listed, namely, 1913-1929, inclusive.

There is a great volume of testimony also on the value of the summer freshets or increases in flows that come from summer rains in the tributary watershed. These, like the spring high waters, would be absolutely cut off by the New York plan. The relief which comes from an occasional high water in the summer when the river is low, and recreational uses are interfered with on that account, is of vital importance and of very great value for the use of the river for recreational purposes. We limit ourselves merely to references to witnesses and page. Brodhead (R. 787, 788); O. H. Staples (R. 799-801); M. E. Staples (R. 806, 807); Roseberry (R. 1075, 1076); Wilson (R. 1105, 1106); Rudolfs (R. 1197-99; 1370-71; 4195); Transue (R. 12-46-7); Eilenberger (R. 1251, 2); Gordon (R. 1259); Cannes (R. 1263, 64); Etter (R. 1269); Wolman (R. 1459; 1471); Graves (R. 1475, 76); Cope (R. 1481, 82); Peters (R. 1486); Worthington (R. 1492); Caley (R. 1498); Feindt (R. 1881, 82); Hershfield (R. 1910-13); Searles (R. 1922-26); Whitman (R. 4256, 57); Barrows (R. 448).

One of the purposes for which the power of eminent domain is exercised, is for public parks and playgrounds, and it has been so exercised on the Delaware River by both New Jersey and Pennsylvania, who have each set aside and maintain as public park and recreational grounds what is known as Washington's Crossing Park (located partly in each state). Another park of this nature is "Eddyside," maintained by the City of Easton a short distance above the confluence of the Lehigh and

Delaware Rivers (R. 1090). The plaintiff therefore has a sovereign interest in the recreational use of the river within its territorial limits. It also has a sovereign interest in the health and welfare of its people to the extent that they benefit by recreational features of this character. There is also the additional interest in the welfare of its citizens who have investments, and are engaged in the business of promoting and operating recreational enterprises, which are the chief sources of livelihood and prosperity of the communities along the river. Mr. Stevenson testified, on behalf of the intervener, that Exhibit 428 shows an area which is called "The Playground" which is extensively used for recreational purposes (R. 3777).

Numerous witnesses testified to the recreational use of the river. The extent of use of real estate for that purpose on the New Jersey side of the river was testified to by Mr. Hershfield, whose peculiar qualifications for appraising recreational properties appear at R. 1901-4.

Mr. Hershfield's testimony is uncontradicted. He classified the 120 miles of river frontage as follows: Ten miles of wild land adapted to recreational use, valued at $91,000; land occupied or suitable for bungalows and summer residences along the river, valued at $1,913,200; land used for year-round homes on the river valued at $255,000; hotels and boarding houses dependent upon the river, valued at $239,000; land occupied by camps and similar resorts depending upon the river, valued at $192,000; and fishing places (R. 1909), boat houses, bathing beaches, etc. valued at $127,060. The section between Lambertville and Trenton is especially affected by the river and has a valuation of eight million dollars, exclusive of islands. The total valuation of the river front property in New Jersey, that would be affected by the proposed diversion is $11,379,200. The witness then describes conditions which lead to his conclusions of the nature and extent of damage that would result from the proposed diversion for a sixty-

mile stretch between Phillipsburg and Port Jervis. At least 80% of the available river front property is dependent upon the river for existing and future values. South of Phillipsburg that condition is not so pronounced, but from Delaware, N. J., including the Water Gap, the shore use is absolutely dependent upon the river for its highest usefulness; which is recreation and human habitation (R. 1909, 1910). This is not only his own opinion but also the consensus of opinion of 16 associate real estate experts, one from each of the sixteen sections into which the river frontage was divided, and one competent experienced man selected from each district (R. 1907), in addition to the opinions of some 250 or 300 men familiar with the subject whom he consulted in his investigation. This witness was permitted by defendants to testify as a representative not only of himself but of his sixteen associate experts who were in court and ready to testify. He found that the river is absolutely essential for the use of the real estate as now used or as may be used in the future. Three features are involved in the effect of the proposed diversion. First, diminution of flow which means a great deal to those who have camps and boats; second, increased pollution resulting from the diversion; third, the absolute necessity of summer freshets to clean the banks and river (R. 1910). It is impossible to give exact figures of damage that would result from the diversion, but such damage would be appreciable to the whole river front. For use as camps and bungalows the damage would represent 100% of the present value because there would be a total absence of purchasers. Its present value would all be gone (R. 1910, 11).

The reputation of the river also enters into values. If the river gets a bad reputation through the concentration of pollution as a result of diminution of flow, people will not come (R. 1912). The effect of the proposed diversion as shown by the testimony and exhibits of the plaintiff's

witness will seriously damage the river property. The values of river front property between Lambertville and Trenton have been limited to a distance of 150 feet back from the river (R. 1916, 17). He did not include any railroad property in his valuations or conclusions.

Mr. Hershfield testified that most of the camps advertise the use of the river for bathing and boating. The proposed diversion would destroy the value of the camps 100% (R. 1910). The structures thereon would be valueless and the land would revert to naked ground, some of which might have a value for agriculture but could not be used for camps or resorts. Hundreds of people have bought summer homes along the river solely for the purpose of using it and looking at it (R. 1911). If the river is adversely affected by the proposed diversion they would move away. The witness has had two previous experiences with this kind of a problem and mentioned particularly the Passaic River where millions of dollars' worth of homes were destroyed or abandoned (R. 1912).

The testimony respecting the result of the proposed diversion upon the recreational uses of the river will be summarized as briefly as possible, consistent with the necessity of demonstrating that the Master's conclusions were amply justified.

The witness Searles has lived along the river at Belvidere fifty years and has been engaged in the real estate business and the development of bungalow colonies on the river. The threat of the proposed diversion has already depreciated the value of riparian properties for such purposes (R. 1925).

Exhibit 202 was offered by Mr. William L. Caley, Secretary of the Monroe County Publicity Bureau, an organization for the promotion and development of communities in Monroe County, Pa. (R. 1497), which embraces a considerable portion of the Delaware River water front in

Pennsylvania. That exhibit shows 76 hotels, cottages, and recreational features within the neighborhood of the Delaware Water Gap, with a valuation of $6,763,600. The exhibit is not offered to prove damages to Pennsylvania property but merely to show the extent of recreational development in the territory to which it applies. This development depends entirely upon the river (R. 806-7; 961).

The witnesses on this subject are: Feindt, who operates a camp of 13 acres, consisting of 26 buildings, representing an investment of $100,000 and entertaining about 1,200 people during the season (R. 1880, 1881); Snyder (R. 963-4); Flack (R. 966-7); Hoffman (R. 972-3); Pralf (R. 974-6); Weidman (R. 978-9); Meyers (R. 981-2); Roseberry (R. 1074-5); Chidsey (R. 1086-90); Wilson (R. 1106-7); Transue, who operates a camp at Shawnee (R. 1246); Eilenberger (R. 1250-5); Rittenhouse (R. 1256-7); Gordon, who operates a Y. M. C. A. camp which accommodates approximately 500 boys (R. 1258-60); Cannes, Director of Philadelphia Boy Scouts, which operates a camp at Treasure Island for over 2,000 boys (R. 1261-6); Etter, who operates a Boy Scout camp for an organization with a membership of 1,600 boys (R. 1267); Graves, proprietor of the Deer-Head Inn at Water Gap (R. 1474-7); Cope, proprietor of the Kittatinny Hotel which opened in 1825 and now entertains 25,000 people during a season (R. 1481-4); Peters, who operates a hotel at Bushkill (R. 1485-9); and Worthington, whose company owns and operates Buckwood Inn and the Shawnee Country Club at Shawnee, accommodating from ten to fourteen thousand people a season and embracing an area of 6,400 acres, 6,000 acres on the New Jersey side and 400 on the Pennsylvania side (R. 1489-96); and who has an investment of 2½ million dollars (R. 1492).

It appears from this testimony that the Delaware River from Tri-State Rock to Trenton is extensively used for

recreational purposes such as boating, bathing, fishing, summer residences and camping.

It, therefore, clearly appears that the proposed diversion will seriously affect and injure the recreational uses of the river. These recreational uses have been enjoyed for more than a century and large investments have been made, dependent entirely upon such uses, which would suffer serious injury from the proposed diversion.

Plaintiff respectfully submits that the Special Master's conclusion that the diversion proposed by the defendant city will cause substantial damage to the recreational uses of the river by plaintiff and its citizens, is amply supported by the weight of the evidence.

(b)

Oysters.

The Master's conclusions are summarized as follows: Undoubtedly the oyster industry of plaintiff in Delaware Bay is an important and extensive one, which has been extended and developed, under the fostering care of the State for many years, until there are now 20,000 acres of natural beds and 30,000 acres of planted beds. He then describes the development of the areas, the value of the crops (R. 4916) and of the various equipment and property devoted to and the number of persons employed in or depended upon, that industry. He found that the plaintiff has done more than any other state in preventing the destruction of this great natural source of food supply (R. 4918).

The Master's conclusion was that no doubt remained that the proposed diversion will to some extent affect salinities on the oyster ground which in turn would adversely affect the oyster industry (R. 4932) and that the proposed diversion will at times increase and accentuate

natural adverse variations in salinities and other conditions. He makes particular reference to the testimony of practical oyster men. He finds that the proposed diversion will result in greater damaging effect than New Jersey should be called upon to bear.

These findings are the subject of exceptions by the defendant city and defendant state. No exceptions were filed by the plaintiff because the finding was favorable to its contention.

The Extent of the Industry.

Joseph N. Fowler (R. 1856-69), the President of the State Board of Shell Fisheries since 1922 and associated therewith since 1915, testified that one of the duties of that Board was to promote the oyster business. He is a practical oysterman with 30 years' experience in the business and has owned and operated oyster boats since 1918. The Board has charge of the natural oyster beds comprising about 20,000 acres, and of the planted beds which are leased to citizens of New Jersey by the plaintiff, comprising about 30,000 acres of the bed of the Delaware Bay. The Board also administers the various laws including the "rough cull" law in the interest of the business. In cooperation with the oystermen, the State purchases shells from the oyster houses and places them on the natural beds for the collection of "sets," to which the oyster larvae attach in the spawning season. The State furnishes about one-quarter of the shells and the oystermen furnish three-quarters. The administration of the rough cull law and the law requiring the planting of shells on the natural beds have changed those beds from a series of lumps or spots of the area of about two city blocks, to an almost continuous bed from the Egg Island bed to the Cohansey bed, including areas that were previously unproductive. The natural beds have thereby been increased so

that there is now eight or ten times as much dredging of oyster seed as there was before these laws were applied.

In 1929 there were 255 licensed oyster boats representing an investment value of $2,550,000. They are licensed by the State at the rate of $4.00 per gross ton. There are, in addition, 117 licensed "tongers" whose boats represent an investment value of $117,000. Tongers are individuals who operate small boats and dredge by hand. There are 110 storage floats valued at $165,000. The natural beds are valued by the State Board of Shell Fisheries at $26,775,000 (R. 1867). Bivalve and Maurice River (one on each side of river of the latter name) constitute the center of this industry and are reached by the Central Railroad of New Jersey on the Bivalve side of the river and by the West Jersey and Seashore Railroad on the Maurice River side. The railroads maintain large loading platforms and shipping houses. There are between 600 and 700 pilings 45 feet long driven in the river, for oyster floats, valued at $500,000. These two railroads have about one and one-half miles of river front and their buildings, two stories high, cover 600 feet on each side of the river. There are two wharves or loading platforms on each side of the river, each about 600 feet long and ten feet wide, There are fifteen other wharves averaging 60 feet long and 20 feet wide, used exclusively for oyster business. There are seven shucking houses that cost $350,000; seven marine railway connections costing $175,000; six ship chandlers whose buildings and stock represent a value of $150,000; four blacksmith shops valued at $60,000; and two sail lofts valued at $50,000. There are also about fifty miles of railroad track, including switches, devoted entirely to the oyster business. There are 4,500 people employed in dredging and planting oysters during May and June. The oyster industry has a continuous season of ten months. It is closed during July and August on account of spawning.

The vessels range in length from 75 feet with 19 foot beam, to 105 feet with 25 foot beam. The larger vessels are as much as 100 tons displacement. The vessels average 15,000 bushels of seed oysters dredged per season from the natural beds.

The natural oyster beds are open to citizens of New Jersey, who pay a tax of $4.00 per gross ton on vessels employed in dredging above the "Southwest Line." Below that line they hold leases from the state for various areas of land on the bed of the bay for which they pay an annual rental of 75 cents per acre. Seed oysters dredged from the natural beds become the private property of the oysterman and are planted upon his leased ground where they remain for about three years, depending upon the size and condition. There are 200 scows used to bring oysters from the storage boats, valued at $100,000. The lessees of planting grounds, in addition to the annual rental, spend about $300 per acre for shells with which they provide "bottom" to keep the planted oysters out of the mud. The 30,000 acres of planted grounds represent an investment of the oysterman of approximately $9,000,000. The average planter carries about three years' supply of oysters, in the progress of development from seed to marketable size. Seed oysters planted represent a cost of about 60 cents a bushel. At the end of the second year they are worth about 75 cents a bushel in the beds. At the end of the third year they are worth $1.00 a bushel in the beds; representing an additional investment of the planters of about $9,000,000 so that the oyster planters in Delaware Bay have investments of upwards of $18,000,000 on the lands which have been leased from the state, making a total of investment or value for oyster planters and state in the natural and planted beds of approximately $45,000,000.

There are seven towns in Commercial Township and Maurice River Township that are practically wholly de-

pendent on the oyster business. There are four towns in Fairfield, Lawrence and Downs Townships which are partly dependent on that business. Commercial Township has a population of 2,873 in 1930 and the others have populations averaging about 1,200 each. The stores and other places of business in those towns, as well as ship yards, ship chandlers, shucking houses, blacksmith shops and railway, depend upon this business. About seven banks in Cumberland County, in the vicinity of the oyster business, would be much affected by the loss of that business.

Charles W. Peace (R. 1885-9), Chief of the Board of Shell Fishers, Maurice River Cove Department, produced the original license books relative to the oyster business on Delaware Bay. These books show that from 1920 to 1929, inclusive, there was an increase in oyster business from 188 boats with a tonnage of 4,389, to 247 boats with a tonnage of 7,608. There are at present 232 lease-holders of oyster planting grounds covering 31,436 acres. These leases are assignable. The greatest number of shipments occurs during November.

Wilbert Robbins (R. 1890-7), Secretary of the Maurice River Cove Oyster Growers and Dealers Association, produced the records of oysters caught each year and the values. These records cover the years 1925-1928, inclusive. They were in round figures, as follows: 1925, 464 million oysters, value over $4,000,000, value of shucked oysters, nearly $6,000,000; 1926, 403 million oysters, value nearly $4,000,000, value of shucked oysters $1,500,000; 1927, 370 million oysters, value three and one-third million dollars, value of shucked oysters one and one-half million dollars; 1928, 453 million oysters, value four and three-quarter million dollars, value of shucked oysters two and one-quarter million dollars. The vessels have an average crew of twelve men each. The figures of catch and value for 1929 were not complete at the time he testified.

George A. Mott (R. 1845-56), Director of the Board of Shell Fisheries, testified that he had been connected with the state administration of shell fisheries since 1890. He presented a map showing the lands leased in Delaware Bay by the state to its citizens for oyster planting. (Exhibit 231.) He also presented Exhibit 232 showing the receipts and disbursements of the plaintiff in connection with oyster regulation and promotion. It shows that the state has spent to date slightly over one million dollars and has received in land rentals, license fees, etc., slightly over $800,000. The expenditures were made for shell plantings and other purposes for the improvement of the quality and extent of the natural beds, as an investment for the future development of the industry.

Henry L. Fryer (R. 2050-3) of the State Board of Taxes and Assessment, which assesses all main line railroad property in the state, testified to the value of the railroads used in the oyster business at Bivalve. The Central Railroad of New Jersey has 21 miles of main track assessed at $332,126 and the West Jersey and Seashore (Pennsylvania Railroad) has 9.7 miles of main track assessed at $138,884. These are assessments for 1930.

The record shows that the oyster industry was of sufficient importance in the province of New Jersey during 1719, to cause the passage by the colonial legislature of the act for the preservation of oysters (Exhibit 233) and that this was the subject of another act passed February 11, 1775, included in the same exhibit (R. 1852). Subsequent acts of the legislature of the state for the promotion and regulation of the industry are included in Exhibit 234 (R. 1853).

The foregoing evidence shows the importance of the plaintiff's oyster industry.

The development of the oyster business in Delaware Bay from a few spots or lumps of natural oysters, which

were dredged and carried off to market without regard to size or quality, to the present vast extent of those natural beds and the progress by which that development has occurred through the "rough cull" law, which requires the sorting of oysters as they are dredged and the return of the shells to the natural beds, and the "shell planting" law, which requires a certain amount of shells to be returned to the natural beds, are described by the witnesses Mott, who has been familiar with the business for more than fifty years and who has been associated with the state administration of the oyster laws for the past 37 years, and Fowler, who has been engaged in the business for the past thirty years, and connected with the administration of the oyster laws for the past fifteen years, as well as by other practical oystermen (R. 1845-51).

The scientific investigation of the oysters was begun in 1888 by Dr. Julius Nelson, Professor of Zoology at Rutgers College, and was continued by him until his death in 1912. From 1900 until his death Dr. Julius Nelson had the assistance of his son, Professor Thurlow C. Nelson, and from a later date, that of his other son, J. Richards Nelson. Both were witnesses in this case. Upon the death of Dr. Julius Nelson he was succeeded as Professor of Zoology at Rutgers and as Biologist of the State Board of Shell Fisheries, by Professor Thurlow C. Nelson, who has continued the investigations to the present time, and, since 1920, has given particular attention to Delaware Bay and Maurice River (R. 1636-9), with the assistance of his brother J. Richards Nelson, as associate biologist since 1923 (R. 2481). The result of these extensive investigations are given by Professor Nelson (R. 1636, 1642, 1780, 4327).

Summary of Exhibits.

The exhibits used in the oyster testimony are as follows:

Exhibit 213 shows the location of natural and planted oyster grounds in Long Island Sound.

Exhibit 214 is a map showing the location of the natural oyster beds and the planting ground in the Delaware Bay. Each of the natural beds is named and the numbers in the circles indicate stations where salinity samples were taken. It shows the location of the "Southwest Line" which marks the division of salinities above which young oysters normally survive by reason of lower salinities than their enemies can endure. The legend describes the markings of the various areas. The exhibit shows the location of the Brandywine Shoal which is the point where the ebb tide which carries the fresh water down on the Delaware side, turns and brings it back on the flood tide over the planted and natural grounds along the Jersey shore.

Exhibit 216 shows (1) statistics of the oyster industry in Maurice River Cove in 1880 where the area of leased land for oyster planting has increased more than five times and the value of the grounds has increased approximately a thousand times; (2) comparable information for the year 1901; (3) similar statistics, for the years 1925-1928, inclusive, of quantity and value of oysters marketed, and, from 1920 to 1929 inclusive, of the number and tonnage of licensed oyster boats, the number of lease-holders, acres leased, licensed tongers, etc.; (4) list of the banks and amounts of money representing, as of November, 1929, loans outstanding from the banks to citizens engaged in the oyster industry on Delaware Bay, amounting to over one million dollars; (5) stream flow records during 1926, drainage areas and other information concerning the tributaries entering Delaware Bay and Maurice River Cove between Arnold's Point and Pierce's Point; (6) salin-

ity of sea waters off-shore from Delaware Bay with the date, latitude, longitude, station numbers and locations; (7) summary of salinity surveys of Maurice River Cove and Delaware River Bay, with the station numbers, for 1927, 1928 and 1929. Other salinity records are shown in Exhibits 212 (taken by the War Department), 218, consisting of three sheets, with the station numbers and years for each of the samples involved; 300-E, 300-F, and 230 showing salinity readings of Delaware Bay Water for 1927, 1928 and 1929, corresponding to those shown on Exhibit 218.

Exhibit 220 is a photograph of an oyster (life size) with an anatomical description. Exhibit 221 is a photograph to scale of an oyster drill of one variety, and Exhibit 222 is a photograph of another variety. Exhibit 223 is a photograph of oyster shells showing the effect of the drill. Exhibit 224 is a photograph of the egg capsule of the drill. Exhibit 225 is a photograph of six quarts of drills collected by one boat on one day in Maurice River Cove in 1926.

Exhibit 226 is a graph of salinity conditions in Barnegat Bay.

Exhibit 227 is a photograph of starfish, comprising a portion of a catch in a hand dredge in Maurice River Cove, August 7, 1929. Exhibit 228 is a photograph of black mussels illustrating the manner in which they attach themselves to the oysters. Exhibit 229 is a photograph of an oyster shell showing the ravages of the boring sponge.

Exhibit 231 is a map of the leased oyster grounds in Delaware Bay. Exhibit 232 is a statement of receipts and disbursements of the State of New Jersey Board of Shell Fisheries from 1894 to 1929. Exhibit 233 is an act of the Province of New Jersey, passed March 27, 1719, for preserving the oysters, and another act passed February 11, 1775, for the same purpose. Exhibit 234 is a list of the

titles and references to the subsequent acts of the State of New Jersey relative to the oyster industry.

Exhibit 300-G consists of pages 231 to 234, inclusive, of Dr. Bigelow's coast water exploration of 1913, Bulletin of Museum of Comparative Zoology of Harvard College, supplementing pages 228 to 230, inclusive, offered as Exhibit 347.

The Effect of Proposed Diversion.

The natural home of the oyster is where fresh water flows into the sea (R. 1590-4; 1603-4; 1642-4) from which it obtains:

(a) Heat necessary to cause full development of eggs and spawning (R. 1594, 1600, 1632, 1595, 1605-6, 1746).

(b) Chemical substances necessary for attachment and growth (R. 1617, 1599, 1742).

(c) Nutrients which are required by the minute organisms which comprise the oyster's food (R. 1713, 1594, 1738, 2485, 2489).

(d) The salinity barrier required to hold back the marine enemies (R. 1598-9).

(e) The necessary salinity gradient from top to bottom to cause larvae to work upstream (R. 1638-9, 1739).

The marine enemies of the oyster are drill, starfish, mussel, boring sponge and drumfish, all of which require water of higher salinity than oysters, and the area of their activities moves up and down stream with salinity variations produced by variation of fresh water flow.

While the oyster lives in salinities as low as 5 or 6, the dead line of minimum salinity for its enemies is: drills 12.5; starfish 20.8; mussels 17 (R. 1721-2, 1725-26).

The salinity limits of the oyster being lower than those of its enemies, the laws of nature influence the development of natural oyster beds where the salinity is high enough for the oyster but not high enough for its enemies. Such is the situation of the natural beds in Delaware Bay, under the conditions of natural flow of the river that have obtained over a period of centuries. It is true that the enemies do, at times, invade the natural beds during periods of low fresh water flow, but the recurrence of higher flows have, under natural conditions, always been sufficient to drive out or destroy the oyster enemies before they were able to inflict permanent injury upon the oyster beds.

The natural beds of Delaware Bay exist in their present location because of the contributions made to the biology of the oyster by the fresh water discharged in the Delaware River. High spring flows serve to keep the enemies from establishing a permanent foothold there, hence the seed oysters are able to attach and grow to a size suitable for transplanting, unmolested by enemies.

The planted beds enjoy conditions favorable to the growth and maturing of oysters by reason of the dual influence of the fresh water discharge into the bay: first, the direct effect of the immediate river discharge in holding back the flood tide and diluting the more saline sea waters; and second, the indirect effect of the river discharge in diluting the offshore waters from which the flood tide is drawn.

Certain definite conclusions are established which show the particularly favorable conditions existing in Delaware Bay for the almost unlimited development of oyster culture. The testimony establishes the fact that oyster beds are suitable for growth and culture of the oyster only where the sea water is diluted with fresh water from the land and the salinity of the water is thereby reduced to the

extent which produces conditions favorable to oyster propagation. Oysters will not spawn in water that is too cool (R. 1593-4) and therefore the temperature of the water is an important element.

The amount of water an oyster drinks depends upon the temperature. The temperature of water in Delaware Bay is determined by the temperature of the river water flowing into the area. The oyster comes out of hibernation during March and April. As the water warms it drinks more water (R. 1594). The amount of food obtained depends upon the amount of water it drinks since its food is all in the water, therefore the temperature of the water determines the reproductive development and growth of the oyster. The food comes from the land and is brought down by the river flow (R. 1594).

The temperature of the water over the oyster beds during spring and early summer determines the number of eggs developed (R. 1594). The number of eggs thrown into the water by the females has a definite relation to the number of seed oysters produced every year. River water is always warmer than the ocean water during the spring and early summer. The river brings down into Delaware Bay a vast amount of heat which is essential for food and egg development.

The amount of heat that 600 m. g. d. of water brings to Delaware Bay from April to August when the oyster's reproductive organs are being developed increases the temperature of Delaware Bay to an extent equivalent to the heat produced by 17 million tons of coal (R. 1595, 1614-5).

The oyster, like all other forms of life, exists in a state of balance, or equilibrium, between a friendly environment and its enemies. If that balance is disturbed in an unfavorable manner injury or total destruction follows (R. 1594-5).

The operations of these enemies and the biological development of the oyster, are described by Mr. Prytherch, Biologist of the United States Bureau of Fisheries (R. 1590-8). Fresh water from river is the vehicle which brings to oysters inorganic and organic substance from the soil and supplies these oysters with elements absolutely necessary to growth and development. The location of oyster beds depends on a variety of factors. Besides salinity and temperature, suitable bottom is necessary. Sufficient depth of water to protect beds from storms and not too deep for gathering oysters. The removal of substantial quantity of fresh water would tend to change the location of natural oyster beds, to limit or remove those that were near the ocean, and to favor their movement or starting towards the source of fresh water (R. 1600). That would involve destruction of existing oyster beds and the creation of new ones. It takes many years to develop new oyster beds.

He is familiar with the seed oyster beds in Delaware Bay. With firm hard bottom available for new oyster beds, it would require adult oysters for producing seed, planting of those areas with shell, and things to collect seed. Under natural conditions it would require from five to ten years for the reproduction of oyster beds at different locations (R. 1600). The present seed oyster beds in Delaware River are the product of centuries (R. 1601).

Professor Thomas who studied the oyster industry in Delaware Bay for the United States War Department to determine the effect thereon of diversion of water from the river (R. 1799), testified regarding changes in salinity resulting from variations of flow of fresh water in Delaware River (R. 1801-3).

He points out, by way of illustration, that in July, 1928, the run-off was unusually high for summer. The salinity

at Southwest Line was then 13; the dead line for the oyster drill. This illustrates the importance of spring floods in removing oyster drills from natural beds, because at that time the salinity of water over those beds is so low that no large number of drills could survive. This also explains why natural oyster beds do not extend down the bay further than the Southwest Line, since below that line the discharge of the river during months of flood or freshet is not sufficient to reduce the salinity below the death point of drills. Those which occupy the lower portion of natural beds during high salinity periods are killed off during low salinity periods of the following summer. The existence of the natural oyster beds is dependent upon high spring run-offs in the river.

A permanent reduction in river discharge as proposed by N. Y. plan, would result in a permanent increase in the mean salinity of the water off the mouth of the bay and in all parts of the bay. A period of several years would be required to obtain the full value of this increase. The final amount of increase at any point can be computed accurately. The proposed diversion area is 5.4 per cent. of the entire Delaware River drainage area above Arnold's Point (R. 1823).

The mean discharge of Catskill Mountain is greater than those at a lower level on the coastal plain. The proposed reservoirs are capable of impounding the entire spring flow of the streams in the diversion area during certain months, and will necessarily be operated to absorb practically the entire stream flow during the spring months. The proposed diversion will, therefore, produce an average reduction of more than the 5.4 per cent. of spring freshets into Delaware Bay. Under flood conditions of July, 1928, New York diversion would have reduced flow in Delaware Bay 6½ per cent. if the entire amount was impounded in the reservoir (R. 1824). On basis of flows of 1927, 1928 and 1929, the proposed diver-

sion would have taken 4.11 per cent. If the proposed diversion had been in operation for several years prior to July, 1928, the salinity at the Southwest Line would have been increased from 13 to 13.6, or 4.8 per cent. Several years would be required for the actual building up of this salinity in an area approximately 80 miles long and 30 to 50 miles wide, with depths of 100 to 600 feet (R. 1824-5). In the fall of 1929 the salinity at Southwest Line was 22.2. If proposed plan had been in operation for several years prior to that time the salinity at that point would have been increased to 23.7. The proposed diversion would move the salinity grade line at Southwest Line upstream 2.94 miles (R. 1826).

The effects are more serious in dry seasons than in wet seasons; and more serious in summer than in springtime. The shift upstream would be approximately one and one-half miles of salinity grade line. The large body of salt water in lower bay and offshore has a more penetrating effect upstream during low river discharge. Natural oyster beds cannot exist below the Southwest Line on account of drills and other salt water enemies. Above the Southwest Line there is a rapid increase in productivity and value of natural oyster beds until the maximum is reached at Bennie's Bed, which is the most valuable of them all. The center of Bennie's Bed is 6.3 miles upstream from Southwest Line. If Bennie's Bed and those below are destroyed, the oyster industry in those districts in New Jersey adjacent to that bed would shrink to negligible proportions. Other sources of seed oysters would be utterly inadequate for supplying planted areas. If salinity conditions on the center of Bennie's Bed become the same as now existing at Southwest Line, Bennie's Bed and those below would be completely destroyed (R. 1827-8). Oyster drills reached the lower edge of Bennie's Bed in 1929. Any permanent upstream displacement of the salinity grade line would damage this bed and increase

the present annual damage to beds below in proportion to the shift of salinity grade line. The diversion would destroy approximately 23.6 per cent. of the value of Bennie's Bed and those below, which represent approximately 70 per cent. of the total productivity. The diversion would, therefore, destroy 23.6 per cent. of 70 per cent. or 16.5 per cent. of the value of the oyster industry in the bay (R. 1827-8).

This industry has existed for more than two centuries. During that time it has been practically the sole means of support of communities in which it is carried on. The region is unfit for agriculture. If the oyster industry is destroyed inhabitants of this district have no alternate means of support. Homes and property will be rendered valueless (R. 1829).

Dr. Nelson testified that oyster eggs develop into larvae that swim feebly about for about two weeks, carried by the current (R. 1638). Since the bottom layers of the water are of higher salinity than the upper layers, as the tide comes in the larvae rise in the water to reach the lesser salinity and are thereby carried upstream, a fact which is particularly favorable and important in Delaware Bay where the larvae spawned on the planted grounds travel upstream to form "sets" on the natural beds. That is one of the reasons why the natural beds have been so much more successful since the planted areas have become so large. Larvae do "set" in the planted areas, but the salinity there is so high that they do not survive the attacks of their enemies. By traveling upstream to the natural beds where the salinity is normally lower than their enemies can endure, they are able to set at a location where conditions for development are favorable (R. 1638-9).

The diversion of any water from the Delaware River Valley, at any time of the year, will, by that amount, les-

sen the volume of fresh water discharge into the bay, and, if continued, will produce a cumulative effect in increased salinities of the bay to an appreciable degree, which would be immediately reflected in the water of the oyster bearing area during flood tide (R. 1702). The relationship between fresh water and oyster food, as well as the effect of low flows upon the oyster ground, is illustrated by the fact that during the 1929-30 season, when very low water conditions were experienced, 12,000,000 shucked oysters yielded ten pints per 1,000 oysters less than in 1928-29, which was a wet year, and this shrinkage in volume represented a loss of $568,700 (R. 1713).

Bennie's Bed is the backbone of the natural oyster area and yields from one-half to two-thirds of all the seed planted in Maurice River Cove. It lies at the point where present fresh water and salt water conditions are optimum. There is a decrease in productivity of natural oyster beds in either direction above or below Bennie's Bed (R. 1714). There was a good set there in 1928 but none in 1929, when the fresh water flow was low. The proposed diversion, under the New York plan, would have produced a much worse condition because over 5% of the total run-off of the river at Arnold's Point would have been diverted over the entire year (R. 1715, 1718). Fresh water becomes more effective as the temperature rises. Drills can sustain short periods of low salinity but if subjected to a salinity at or below 12.5 for ten days they die. Changes in salinity do not affect oysters in the same degree. They are able to stay closed for several days in fresh water and can carry on their activities in salinities as low as 5 or 6. Oysters have a margin of safety over drills in salinity between 5 and 12.5 and are immune from drills within those limits (R. 1721).

The most valuable natural beds in Delaware Bay, namely, those in, and in the vicinity of Bennie's Bed, have been preserved from injury by reason of the fresh

water run-off in the spring (R. 1722-3), which is usually of sufficient duration and intensity to destroy the drills which may have reached that location during the period of low water flow. The natural beds exist because the salinity of the water is reduced by the fresh water flows from the river, to a point below that which the oyster enemies can endure, and yet remains high enough in salinity to produce a flourishing environment for the oyster. These beds are the result of such conditions existing over a period of thousands of years. They are the sole source of oyster seed for the entire New Jersey industry (R. 1723).

The star fish are also a serious menace to the oysters. Your star fish settle down in the spring and begin their work of destruction immediately. Like the drills, the only protection against starfish which the young oysters have is the difference in salinity, which protects them from the drills. The year 1929 was the first year that star fish have appeared upon the natural beds in any considerable numbers or have done any damage to the beds. That was the result of the low flows during that summer (R. 1723-4). The minimum salinity at which a star fish can exist is 20.8 (R. 1725). In addition to the danger of covering and smothering the oysters, mussels have two serious disadvantages; they are heavy feeders and eat the same food as the oyster. This competition for food results unfavorably to the oysters, mussels filter enormous quantities of water and deposit the sediment on the bottom to the extent of from four to six inches a year, thus ruining an oyster bed (R. 1725-6). The minimum salinity limit of the mussel is about 17 (R. 1726) and he is killed by high water stages (R. 1727).

The proposed diversion by the defendant city would take away fresh water necessary to produce low salinity, necessary food supply and necessary chemical ingredients, and would tend to cause the oyster larvae to work further

upstream away from the sea. It will also increase the sphere of activity and intensity of attack of all of the enemies of the oyster. It would tend to a permanent shift upstream of oyster bearing areas, and Bennie's Bed, which is now the optimum of natural oyster production, would lose its present advantages.

Aside from the loss which would be suffered by the long period of time necessary to reproduce the existing natural beds at some point further upstream, there is the very great and serious difficulty in the way of a movement upstream, arising from the configuration of the bay. The present oyster bearing area has a width of thirteen nautical miles. The width of available area at East Point is nine and one-half miles, and at Arnold's Point, four and one-half miles. The result is that this narrowing of the bay toward the north would deprive the industry of the advantage of the present extensive areas available for oyster culture (R. 1731).

The permanent diversion of waters from the river as proposed will necessarily result in the destruction of all of the existing natural beds between the present salinity line and the relocation of that line upstream caused by the lessening of the fresh water flow. The oyster growers are putting in approximately one-half million bushels of shells yearly on the beds. This practice began in 1922 and has increased constantly ever since. These shells cost 12 cents a bushel planted. If the oyster bearing areas are shifted, shell planting would have to be increased ten-fold for a number of years in order to build a suitable foundation for oyster sets on what is now a soft bottom. It would take many years and many million bushels of shells to move the oyster beds and it would also deprive the state and the planters of the seed oysters while this process of movement was going on (R. 1735-6).

All the enemies of the oyster (drills, starfish, mussels, boring sponge, and drum fish) move upstream according

to the increase in salinity, and they all require water of higher salinity than the oyster (R. 1595-1600). Their effect upon the oyster is illustrated by the fact that sets in Maurice River Cove in the planted area were found to be drilled from 32% to 100% during the first season up to October, and those that remained were drilled the following spring (R. 1717). Owing to the low flows during 1929-30, drill eggs were found on Bennie's Bed in May, 1930, where they had never been seen before (R. 2484). Starfish were found in numbers on 77 grounds in the planted area of Delaware Bay in 1929, and the oyster planters were required to spend $10,000 in attempts to combat them (R. 2494; 1723). Mussels settled heavily on the oysters in 1929 (R. 1725-6).

Mean flows have no application to the oyster industry, since the periodically high flows are necessary to kill or hold back the marine enemies (R. 1720-21). The natural beds extend north from the Southwest Line to above Arnold's Point and lie between the New Jersey shore and the main ship-channel (Exhibit 214, R. 1647). Due to the river flow, the ebb tide is two hours longer than the flood tide (R. 1673), and the tidal current in Maurice River Cove is northwest and southeast. The flood tide follows the channel and turns back into the cove at Brandywine Shoal, with a result that the river discharge which passes down the ship-channel along the Delaware shore on the ebb is brought back on the succeeding flood tide over the oyster beds, thus producing a multiple benefit from the fresh water flows of the river (R. 1673). The prevailing summer winds help to drive the salt water up the bay (R. 1674-5). The fresh water tributaries entering the bay in the vicinity of the oyster bearing areas on the New Jersey side constituted in 1926-8 only 4.9% of the total fresh water discharge of the river at Arnold's Point (Exhibit 216; Exhibit 217, Appendix 5 (R. 1679).

The testimony of the scientific witnesses is supported by the practical experience of oystermen.

Smith Blackman (R. 1784-9) has been captain of an oyster boat engaged in the dredging, planting and harvesting oysters in Delaware Bay for 51 years. Bennie's Bed is the best of all the beds and is the principal source of seed. What was formerly a few good spots have become an almost continuous oyster dredging area. When they have plenty of fresh water they do not have the natural oyster enemies as they do with less fresh water. That has always been his experience. The year 1929 was a low water year and resulted in a very poor oyster season. Starfish used to be a curiosity on the oyster beds, but this year they dredged up thousands of bushels of them. The season of 1928-9 was an extra good one. A change in the oysters is noticeable after a northeast storm for a day or two which drives in the sea water. The oysters fall off in quality and size. Northwest winds bring fresh water into the bay and the oysters show the benefit of that.

Clarence Robbins (R. 1788-92) has been growing, planting and shipping oysters in Delaware Bay for 41 years, and captain of a boat for 38 years. By the application of the "rough cull" law, which requires the separation of oysters from shells during the dredging and throwing the shells back, the beds have spread out until they have almost come together. Bennie's Bed is the biggest single bed and the principal one. It and New Beds, Egg Island Bed, and Beadons Bed, comprise the lower part of the natural beds and represent 75% of the area and production of the natural beds. Oysters are better in a wet season because they are not bothered by their marine enemies. The oyster season from September, 1929, to July 1st, 1930, was a very poor season, while that of 1928-9 was one of the best they ever had. When a northeast storm drives the sea water into the bay, oysters

fall off and get poor, but oysters are always good after a northwest wind which drives the sea water out into the ocean, and lets the fresh water from the river down into the bay. Ninety times out of one hundred he can tell whether the oysters will be good by the way the wind blows.

David Robbins (R. 1792-8) has been engaged in the oyster business in Delaware Bay for 32 years and is captain of his own boat. During that time the natural oyster beds have practically doubled in area, as a result of the observance of the "rough cull" law. The quantity of fresh water in the river has a great deal to do with the oyster business. He corroborates the testimony of the two preceding witnesses regarding the effects of the storms on the oysters, and also with regard to the relative volume of oyster business for the seasons of 1929-30 and 1928-9.

Joseph N. Fowler has been in the oyster business on Delaware Bay for 30 years (R. 1857). He testified that the saltier the water is the more the oysters are affected by marine enemies. The fresher the water is the fewer these enemies are. Originally oysters were found only on the natural beds above the Southwest Line. Dredging the natural beds for seed and planting them on other ground in the cove was the result of an experiment (R. 1860). He corroborates the preceding witnesses on the comparison of seasons for the last two years and says that the conditions in 1928-9 were better because they had a large flow of water in the river. The quality and quantity of the oyster product depends directly upon the amount of river water. This has been a recognized fact in the business as long as he has been in it. They have more trouble with drills during the dry seasons (R. 1860). From his experience in watching very closely the seasons and their effect upon the oysters, he is satis-

fied that anything that disturbs the lower salinities of the bay would seriously affect the oyster industry.

Wilbert Robbins testified that he has been an oyster planter for the past 25 years (R. 1890). The day before he testified (May 13, 1930) he found starfish on Bennie's Bed and Egg Island Bed. He never saw them there before. Their presence was caused by the higher salinity of the water due to the low flow of fresh water in the river. Bennie's Bed has the greatest production. It produces about 75% of all the seed oysters (R. 1898-9). They have trouble with mussels, drills and drumfish, when they do not have enough fresh water coming down the river. The success of the oyster season depends upon the flow of fresh water in the river. At the time he testified the water level in the bay was about two feet lower than usual because of the small flow in the river (R. 1900).

Defendants produced three witnesses (Wells, Parsons and Wood), and the intervener produced one witness (Morgan), who testified against plaintiff's contentions concerning oysters. Only one of those witnesses (Wells) had any familiarity whatever with the oyster business and he was not familiar with the conditions or industry in Delaware Bay. Their testimony was based primarily upon conditions existing in Long Island Sound, and involved the following theories:

(a) that the natural variation in salinities in Delaware Bay were greater than the change that would be caused by the proposed diversion,

(b) that the oyster industry in Delaware Bay would adapt itself to the changed condition,

(c) that an oyster industry flourishes in parts of Long Island Sound where salinities are higher than in Delaware Bay.

The "natural variation" theory is plausible but unsound because while oysters endure wide variations of salinity and would not be affected *per se* by the change in salinity caused by the proposed diversion, yet that diversion would deprive the oyster beds of those periods of low salinities which now drive or hold back the threatened invasions of the enemies, and destroy those which have succeeded during low flows in reaching the beds.

The "adaptation" theory is possible but the answer is two-fold. In order to maintain that favorable salinity grade line which nature, through thousands of years of experiment, has demonstrated to be essential to oyster development in Delaware Bay, the natural beds would have to be moved up the bay, either by the slow processes of nature or by the aid of artificial means. The first method would require many years; the latter at least ten years and millions of dollars in expenditures for shell planting to create a new bottom. Meanwhile there would be a substantial loss of seed for the planted areas. The second phase of the answer is that owing to the configuration of the bay, movement upstream means great loss of area.

Both theories may be illustrated by application to human beings. Man lives within the Arctic Circle and at the Equator, which affords a wide spread in the "natural variation" of climate and temperature in which man, as a species, can live, and also a wide variation between the limits of his adaptability. However, that fact does not demonstrate that an Esquimaux would prosper at the Equator, or that an Amazon Indian would thrive within the Arctic Circle. Different varieties of the same species of animals and plants have their choice of environment, sometimes only a relatively short distance apart. One variety grows better in one place or soil than in another. Oysters as a species may be subject to wide natural variations in salinity and be adaptable to varying extremes, but the fact is that adaptation is a process of centuries,

and even within the limits of natural variation there are optimum conditions in which the species becomes commercially profitable, and not in others. The uncontradicted testimony shows that attempts to transplant oyster seed from Delaware Bay to Long Island Sound, and from Long Island Sound to Delaware Bay, have failed from natural causes (R. 1737-8). The natural conditions found in Delaware Bay due chiefly to the flow of fresh water from the Delaware River present the optimum conditions for the highest commercial development of oysters in the United States.

Nature, in the course of centuries of experiment, has developed the oyster industry in Delaware Bay, and in relatively recent years, man, by aiding processes of nature, has produced a high state of commercial development, which would be impaired or destroyed by the proposed diversion of water from Delaware River.

The diversion of water as proposed under the New York Plan will remove from the Delaware Basin freshwater needed:

(1) To supply low salinity and chemicals necessary for attachment of oyster larva.

(2) To bring about the reaction to the ebb and flow of tides which will carry the larvae upstream to the natural beds.

(3) To supply food to the oyster.

(4) To limit the sphere of activity of marine enemies.

(5) To supply the heat needed for proper development of the eggs (R. 1731, 1738-9).

The fresh water represented by the New York diversion would in one year's time reduce two points of salinity in a mass of water a mile wide, 20 feet deep and 525 miles long (R. 1759). The diversion would exercise its maximum effects between April 1st to October 31st (R. 1781-2).

The release provided for under the plan is too small to be of significance (R. 1631).

The present condition and extent of the oyster industry in Delaware Bay and Maurice River Cove depends upon the maintenance of the present flows of the Delaware River. Any permanent increase in the salinity of the water of Delaware Bay and Maurice River Cove will result in permanent damage by the enemies of the oyster and in an extension of the area of their activities. The testimony clearly shows that the oyster industry is threatened with serious damage.

Plaintiff as the owner of the natural beds and of the ground in the planted area, and its citizens, including the two hundred and thirty-two leaseholders on planted grounds, have property rights of the value of at least fifty million dollars.

Plaintiff submits that the Special Master's conclusion that the diversion proposed by defendant city will cause substantial damage to this oyster industry, is amply supported by the weight of the evidence.

Elements of "slight" damage.

The items of slight damage found by the Master (other than navigation, water power and industrial uses, which are discussed in our main brief), relate to the subjects of sanitation, fish, municipal water supply and agriculture. He concluded that "totaling" all the effects of the diversion "indicates a substantial damage to New Jersey and its citizens" (par. 39, p. 206 of Rep.; R. 4966).

While the plaintiff has taken no exceptions to these conclusions, the defendants attack them on the ground that the evidence did not justify a finding even of slight damage; and having attempted to eliminate each separate item of damage (even though it be found by the Master to be

"slight"), they then claim that it was erroneous for him to add various items for the purpose of arriving at a "total" of substantial damage (p. 30 of State Brief; p. 24 of City Brief).

If the Court should conclude that the Master was correct in his conclusion that there was "substantial" damage to recreational facilities or the oyster industry, or both, the discussion of the various items of "slight" damage becomes of relatively minor importance, but we cannot allow to go unchallenged the arguments in the briefs of the defendants that the proof failed to show even slight damage as to any of the several items concerning which the plaintiff claimed not merely slight, but substantial damage; and hence we will briefly consider the items of "slight" damage, not heretofore discussed, to wit; (a) sanitation; (b) fish; (c) water supply; and (d) agriculture.

(a)

Sanitation.

The fourteenth exception of the State of New York is:

> "To Finding or Conclusion, numbered 32 on page 205 of the Report in so far as it finds that there would be even slight adverse effect upon the sanitary condition of the river.
>
> —and to the finding and opinion on page 125 to the same effect;
>
> Because they are contrary to weight of the competent evidence" (p. 7 of Exceptions; R. 5002).

Conclusion 32 reads as follows:

> "The Delaware River is a large stream and a relatively clean stream in the non-tidal section, with the exception of a polluted condition immediately below Port Jervis, though the effect of this pollution largely disappears before the stream reaches Delaware Water Gap. The effect of taking the equivalent of 600 million gallons daily from the tributaries of the Dela-

ware (that is, 928 cubic feet per second) will not materially affect the sanitary condition of the river. The effect will be slight and immaterial" (Rep. p. 205; R. 4965).

"The finding and opinion on page 125 to the same effect" are:

> "On the whole, I am of the opinion and so find that the operation of the New York plan will impair to some extent, though not greatly, the sanitary condition of the Delaware River. I am further of the opinion, however, and so find, that this impairment can be eliminated by requiring sewage treatment at Port Jervis and by changing the amount of water taken by New York City and by changing the plan of release of water, as will hereinafter be set forth" (Rep. p. 125; R. 4880).

The State, in its brief (after quoting from the record with apparent approval the Master's summary of the testimony), concludes:

> "* * * the proper remedy for this condition is the installation of sewage disposal plants and proper treatment of industrial wastes" (p. 30).

The City also excepts to so much of finding 32 "as finds that the proposed diversion will have any adverse effect whatever upon the sanitary condition of the Delaware River" (Exception No. 8; R. 5006).

In its brief the City claims that the "slight and immaterial damage" to this and other interests is "more speculative than real" (p. 24).

The brief of the State of New York omits to point out that the proper remedy for pollution, to wit, "the installation of sewage disposal plants and proper treatment of industrial wastes" (*as suggested* in the brief of the State at p. 30), was adopted by the Master in his proposed decree, in paragraph 4 (a) thereof which reads:

> "(a) Before any diversion shall be made an efficient plant for the treatment of sewage at Port

Jervis, New York, shall be constructed and the sewage of Port Jervis entering the Delaware or Neversink Rivers shall be treated to such an extent as to effect a reduction of 85% in the organic impurities. And the effluent from such plant shall be treated with a chemical germicide, or otherwise, so that the B. coli originally present in the sewage shall be reduced by 90%.

Untreated industrial waste from plants in said town of Port Jervis shall not be allowed to enter the Delaware or Neversink Rivers, and the treatment of such industrial wastes shall be such as to render the effluent practically free from suspended matter and non-putrescent; and said treatment of sewage and industrial waste shall be maintained so long as any diversion is made from the Delaware River or its tributaries" (Rep. p. 210; R. 4970).

The brief of the City omits to point out that the remedy for pollution which is now proposed by the State, was *originally* proposed by the City in its brief before the Special Master, from which we quote:

"On the argument little further need be noted. Yet the defendant City would say that if, in the judgment of the Special Master, it would be desirable or expedient to require the installation of a sewage treatment system at Port Jervis that such a requirement would not be considered as inappropriate or onerous.

* * * * * * * *

"And the defendant City respectfully suggests if the Special Master should conclude, in view of all the circumstances, to rule that the sewage of Port Jervis should be treated that his finding be substantially along the following lines:

The sewage of Port Jervis entering the Delaware and Neversink rivers shall be treated to such an extent as to effect the removal of at least 35 (*sic* 85) per cent. of the organic impurities contained therein and the effluent shall be further treated with a chemical germicide so as to reduce the B. coli originally present in the sewage by not less than 90 per cent" (pp. 113-115 of brief before Special Master).

No exception to this part of the proposed decree has been taken by the State; the City has filed an exception thereto (numbered 54) but has not argued it; hence, it may be reasonably assumed that neither the State nor the City has any serious objection to this part of the decree.

Plaintiff likewise has no objection to this part of the decree, as obviously the treatment of sewage and industrial waste would be beneficial to the river water.

But the mere fact that none of the parties object to the proposed decree in this respect, does not eliminate the necessity of calling attention to the evidence which shows that the diversion as proposed by the New York plan would seriously affect the sanitary condition of the river—at least to the extent of causing "slight" damage; moreover, even though the serious condition which the evidence shows now exists as a result of Port Jervis pollution, would be materially improved by the installation of a sewage disposal plant and by the treatment of industrial waste, there are other sources of pollution which would not be removed thereby.

Generally speaking, there are two principal sources of pollution: The first consists chiefly of raw sewage that comes into the river from municipalities (including Port Jervis) and from industries located in New York State, and which still remains in the water when it reaches the state line. The second principal source of pollution in the section of the river above Trenton is the Lehigh River.

The evidence shows that in both cases the effect of the pollution would be materially increased by the proposed diversion.

Pollution in New York State.

The fact of pollution of the river in New York State is demonstrated by a series of exhibits which were not in any way questioned or denied.

Exhibit 116 is a series of photographs of 156 hotels and boarding houses which discharge their pollution chiefly to the Neversink River below the point of the proposed diversion thereon.

Exhibit 177 (R. 1150) shows ten of the larger communities on the Delaware drainage basin above Port Jervis whose sewers discharge into Delaware River or its tributaries, with little or no treatment of the sewage.

Exhibit 178 (R. 1144) contains photographs of sewage treatment plans and sewer outlets.

Exhibit 179 (R. 1160) is a table showing details of disposal of waste of 61 milk plants located in Delaware drainage basin in New York State. The waste from 15 or 20 of these plants goes directly into Delaware River or its tributaries, while the waste from about 30 is discharged into the river or its tributaries after some preliminary treatment.

Exhibits 180 to 183 (Williams, R. 1163) are photographs which show milk stations discharging directly on the river, crowded street scenes, polluted bathing pools and their effluents and garbage and trash dumps on the banks of streams in the upper Delaware River region.

Exhibit 184 (R. 1177) is a map showing the concentration of population and sources of pollution in the Delaware basin above Port Jervis. The highest concentration is in the southern part of the drainage basin where the pollution from the hundred thousand or more summer residents will reach New Jersey with little purification from time effects.

Exhibit 185 (R. 1200) is a diagram based on records of water analyses made at the Trenton water plant showing a progressive and nearly uniform increase in the B. coli content of the Delaware River water at Trenton beginning in 1921. In 1922 the average B. coli content was about 18.5, which increased to 37 (or doubled) in 1929.

Exhibit 186 (R. 1204) is a diagram showing the relation between the B. coli index in Delaware River water at Trenton and the flow of the stream. The following figures are taken from the exhibit;

The average numbers of B. coli per 100 cc. under present conditions with different rates of flow are as follows:

C. F. S.	B. coli per 100 cc.
4,000	2200
6,000	2600
8,000	2820
10,000	2960
12,000	3030

For flows above 12,000 c. f. s. the B. coli index increases gradually with increased flow. If, therefore, there was a diversion of 600 m. g. d., then for conditions under which the natural flows would have been the same as before, the B. coli index would be increased owing to the increased concentration of the pollution by the taking away of pure water. After diversion the B. coli index for the same quantities of natural flow would be as follows:

C. F. S.	B. coli per 100 cc.
4,000	2880
6,000	3070
8,000	3190
10,000	3280
12,000	3300

Exhibit 199 shows the location of sampling stations.

Exhibit 200 consists of 14 blue print tables showing in detail the results of the chemical and biological examinations of the waters of Delaware River made by Dr. Rudolfs in 1929.

Exhibit 201 (R. 1447) contains the data on which Exhibit 185 was based.

Exhibit 300-A (R. 4182) gives volume equivalents of different percentages of increase and decrease in flow.

Exhibit 300-B (R. 4184) is similar to Exhibit 300-A; for Tri-State Rock, months of June to September, 1914-1929.

In order to show the sanitary conditions on the watershed, a sanitary survey was made in the summer and fall of 1929, for the purpose of determining the conditions with reference to the disposal of sewage, refuse and garbage. The survey included the investigation of towns and other places, the determination of the population in the watershed, methods of disposal of garbage and refuse and other factors that relate to the subject. Both the main river and its principal tributaries were covered in this survey.

The results thereof are shown in above mentioned exhibits numbers 177 to 183, which were described in detail by Mr. Williams (R. 1141-1168).

Estimates of population on the Delaware River watershed in New York State were prepared in order to determine both the summer and the permanent or all year around population in this area, by investigating the summer population by a party of four engineers working in the field, who made house counts and inquiries of populations resident in boarding houses, hotels and other houses where summer boarders are accepted. As a result of this procedure and, by making use of census

estimates, it was determined that approximately 160,000 people were resident in this territory during the summer season of 1929, and that the same territory supports an additional permanent population of about 85,000, making a total of approximately one-quarter of a million people resident on the watershed in New York State during the summer time.

On the basis of this sanitary survey and population estimates it is evident that the tributaries of the Delaware River in New York State receive a considerable amount of raw and partially treated domestic sewage and of industrial wastes. The condition of the streams in this area indicates that the present natural flows of the stream are essential for the avoidance of objectionable conditions.

The Quality of the Water

During the summer of 1929 an analytical survey was made of the river by Dr. Willem Rudolfs. Following is a summary of his testimony. Sampling of this stream was started on July 5 and was completed on September 9, 1929. Samples were taken every other day after a 24-hour survey was made early in July to determine the particular hour of the day which would be characteristic of the stream. In order to have a fair representation of the stream at a particular cross-section, one sample was taken one-third from the west bank, one in the center and one one-third from the east bank. For some of the analyses these three samples were mixed whereas for others they were analyzed separately, depending upon the character of analysis to be made. Separate samples were taken for bacteriological and for chemical purposes. All the samples were taken at mid depth of the stream, that is, half-way from the bottom to the surface (R. 1182-4).

The locations of the sampling stations are shown on Plaintiff's Exhibit No. 199. They extend from below Tri-State Rock to a point below the City of Philadelphia. Determinations were made of the following characteristics of the stream (R. 1185): Temperature, dissolved oxygen, bio-chemical oxygen demand, B. coli, hydrogen-ion concentration, color and turbidity. The results of these determinations are shown in Exhibits Nos. 187, 188 and 200.

It may here be noted that the bio-chemical oxygen demand of a water is the amount of oxygen which is consumed by impure water in a given period of time at a definite temperature, due to the oxidation of the material in the water by biological action. From its amount one can determine by calculation the pollution load placed upon the river, due not only to human sewage but to industrial wastes (R. 1185). The sewage discharges, for example, of a single individual have a bio-chemical oxygen demand for oxidation of the waste of approximately 0.2 pound of oxygen per day. The dissolved oxygen in a stream is the quantity of atmospheric oxygen which is physically contained in a given amount of water at a given temperature and at a given atmospheric pressure. Water will hold a certain amount of atmospheric oxygen (R. 1186). For example, at 29.92 inches barometric pressure and a temperature of 10° centigrade, water would contain 11.33 parts per million of atmospheric oxygen.

Another measure of pollution of streams is the bacterium coli, an organism originating in the intestinal tract, always associated with disease bearing organisms such as typhoid fever. The bacterium coli or B. coli are simpler of identification than typhoid fever bacilli, and are, therefore, used as an index of pollution for most practical purposes (R. 1186). The number of B. coli in a given quantity of water is the index used in the study of the

Delaware River. The number of B. coli per 100 cubic centimeters is the basis of comparison. A hundred cubic centimeters is about one-third of a tumblerful of water.

The sanitary quality of a water depends, according the use to which the water is to be put, upon the bacteriological, chemical and physical characteristics of the water. Different standards of comparison of the sanitary qualities of waters therefore must be used in relation to the uses of a stream (R. 1453). The quality of the water, therefore, as it enters the State of New Jersey, was determined in both the Delaware River and the Neversink River, at Tri-State Rock. The five-day bio-chemical oxygen demand in parts per million was 2.41 on the Delaware River and 1.67 on the Neversink River. The dissolved oxygen in parts per million at the two stations respectively was 8.26 and 7.79. The B. coli per cubic centimeter were on the Delaware 240, and on the Neversink 114 (R. 1188). On the basis of the dissolved oxygen and the bio-chemical oxygen demand at these two stations, together with the visual evidence of the discharge of human sewage at Tri-State Rock, the water of the Delaware River at Tri-State Rock is in a relatively polluted condition (R. 1453).

Given the physical evidence of human and industrial discharges into a stream, as made available by such a sanitary survey as was carried out on the Delaware River watershed in New York State, the effect of such discharges has thus been determined by analytical investigations of the stream. Extensive sampling of the stream at various strategic stations was carried out during this period, with due precaution as to collection and examination of materials for chemical, bacteriological and biological characteristics. From the standpoint of numbers of samples and numbers of stations, this analytical survey was sufficiently complete and detailed to give a fair representation of the character of the Delaware River water from Port

Jervis to below the City of Philadelphia. Included in the analyses were determinations of temperature, dissolved oxygen, bio-chemical oxygen demand, B. coli, hydrogen-ion concentration, color and turbidity (R. 1182-1187).

The Effect of Diversion at Tri-State Rock.

The volumetric effect of the proposed diversion is fully set forth under the subheading of *Recreation* previously discussed herein.

One of the legitimate uses of a river is to carry away a certain amount of waste and drainage from the population in the watershed, and the population which the watershed will sustain depends upon such drainage possibilities. As the population increases, means of reducing the pollution through treatment by scientific methods progress. Those are natural conditions that always exist on all streams and when regulated by proper legislation and administration the situation is usually kept fairly well in hand, but when the volume of relatively pure fresh water is taken away and the amount of dissolved oxygen which it contains is lost to the stream, a sudden and unnatural accentuation of the effect of pollution results. The citizens of New Jersey within its territorial limits in the Delaware watershed are thereby confronted with one of two alternatives; a limited population capacity or the necessity for additional expenditures for treating sewage. The dissolved oxygen is taken out absolutely and permanently. There is no possible way of restoring it, and sooner or later its absence will be felt, and reflected in the necessity for either one or the other of those alternatives.

The figures that the disadvantages of the New York plan during the summer months are greater by far than the slight advantages which would result from proposed releases. As quantities of reasonably good water are re-

moved from any cross-section of the stream, the concentration of organisms at that cross-section will increase. The diversion plan, therefore, will result in injury to the river at Tri-State Rock the greater part of the time.

(b)

Fish.

The Master concluded that the effect on shad fisheries would be "slight and immaterial" (par. 36, p. 205 of Rep.; R. 4966).

The defendants except on the ground that the evidence did not justify "even" such damage.

Since the year 1765 numerous statutes have been passed for the regulation and protection of fisheries on the Delaware River. A list of these is found in Exhibit 261.

The records of the New Jersey Fish and Game Commission from 1924 to 1929 show that the shad catch during those years varies from about 40,000 to over 100,000 (R. 2141). The Secretary of the Board testified that the catch depends upon the condition of water and temperature. For several years the young fish were killed by pollution and the subsequent catch was affected (R. 2143).

During the past three years the State has hatched and put into the river millions of shad fry—over 3,000,000 being placed during the years 1929-30.

Mr. Prytherch spent a year studying shad, including time required for maturity, number of times it spawns, etc. Shad fishing occurs when they migrate into rivers and bays to spawn (R. 1601). The fundamental cause of migration is the desire to find fresher water where conditions are more favorable for the eggs and the young (R. 1601). They have the ability not only to detect fresh water but also to detect the water where they were originally hatched. Shad

return to Delaware Bay for the first time when three years of age and spawn every year after that if successful in getting up the river. After spawning, shad collect in large numbers and return to the ocean, staying in the bay sometimes until late fall (R. 1602). The amount of stream flow affects their ability to return to the ocean after spawning. They are seriously injured by warming of water at low water periods, and their inability to get back down the river at such time (R. 1602) would undoubtedly cause mortality and explains the presence of dead fish on the banks of the river during the summer. The amount of the catch is co-related with rain-fall and the flow of the river. High waters stimulate migration. There is a direct relationship between the high flow of waters in the river and the migration of shad (R. 1603).

It was shown by the testimony of men who had been engaged in the business of shad fishing for periods varying from fifteen to fifty years, that the shad run better when the water is high and that the amount of the shad catch depends upon the height of the river during the season of the run, that is, during the last two weeks in April and the first two weeks in May.

See testimony of the following witnesses:
Roseberry (R. 1078-1079).
Peters (R. 1486-1488).
Shultheis (R. 2054; 2056-2059).
Ashmore (R. 2059-2061).
Steward (R. 2062).

During shad season the New York plan allows the impounding of the entire run-off of the diversion area.

It is apparent that the fish industry will suffer substantial injury.

(c)

Water Supply.

The defendants except to the conclusion of the Master that the effect of the New York diversion upon the water supply at Trenton and other New Jersey municipalities will be "slight and immaterial," on the ground that under the weight of the evidence there will be *no* adverse effect upon the river as a source of municipal water supply.

The evidence on this subject relates to the cities of Phillipsburg, Trenton and Burlington.

The city of Phillipsburg, N. J., having a population of about 19,000 people, formerly obtained its water supply from the Delaware River, but about 1907 or 1908 the river water became so bad during July, August and September that the city was compelled to build a filter and a pumping plant in a hole about eight feet below the river level along the river, which now supplies about 6 m. g. d., principally from ground water which filters into that hole (R. 1102). Mr. Wilson, the engineer of the water company at Phillipsburg, testified that if the river level was lowered anywhere from six to ten inches, it would take the water away from their pumps and they would not be able to get a supply from their present source (R. 1102). At the present time the water is bad in the river during July, August and September. If the low water period was continued for four months without the benefit of rains or summer rises, the present situation would be changed for the worse (R. 1098).

Other municipal uses of water on the New Jersey side of the Delaware River are at Trenton and Burlington. On the Pennsylvania side, Chester and Philadelphia are the major users, Philadelphia using Delaware River water to the extent of approximately 60% of its total water supply (R. 1463-1464).

The filtration plant of the City of Trenton is a rapid sand filtration plant designed for a capacity of thirty million gallons. About 18½ million gallons are delivered daily, varying from approximately 16 to 22 million gallons a day. The water is obtained from the Delaware River, is coagulated, settled and filtered. From the filter it passes to a clear well and from there is pumped into a storage basin holding approximately 5 days' supply (R. 1294).

The plant has been shut down a number of times from 1915 to 1929 due to the occurrence of unsatisfactory raw water and to tastes and odors from phenol-like materials (R. 1295). The dates of shut downs, the extent of shut downs, the natural flows in the Delaware River on the date of shut downs and the probable flows with the diversion plan in operation, are shown in Plaintiff's Exhibit No. 300-P (R. 1340).

The plant is shut down either because of the difficulty of removing tastes and odors from the Delaware River water or because of the black water or other turbidity of high amounts in the stream. Whenever taste and odor difficulties are experienced the river usually carries black water at the Trenton intake, which is about 100 yards south of the Calhoun Street Bridge (R. 1344).

Mr. Reed, the superintendent of the plant (R. 1294), testified that he has been at the plant for nine years (R. 1294). The city has no storage for untreated water and only about five days storage of treated water, used as an emergency supply. He produced at the hearing samples of water from which phenol taste is obtained. Black water containing coal dirt usually appears the second day after a storm (R. 1295). He made quantitative analyses for phenol four years ago (R. 1296) and again on October 5, 1929. The black water is easiest to filter, but is more highly contaminated with bacteria. He had to shut down the plant on October 4 and 5, 1929 (R. 1296). The maximum period of shut-down is determined by the capacity

of the emergency reservoir, and he has been compelled to use the water under shut-down conditions on almost every occasion of shut-down on account of the limited capacity of the emergency reservoir (R. 1340).

These conditions of bad water have lasted for three and one-half days (R. 1340). They have to shut down when the Lehigh water has a turbidity of 500. They can continue with the other water up to turbidities of from eight to nine hundred. The filter plant has settling basins of six-hour capacity, which is more than the average plant has (R. 1341). These shut-downs have not been caused by breakdowns or repairs. They were all due to bad water (R. 1342). Seventeen of these shut-downs occurred during the months of November to June, inclusive, and thirteen occurred in the months of July, August, September and October.

If any considerable quantity of water is taken out of the river during the winter months it would make a big difference from both the bacteriological and phenol standpoints. Their present storage capacity would be sufficient if it were not for bad water (R. 1343-1344). Taste and odors always accompany black water (R. 1344).

Mr. Horton testified that he made an investigation in 1928 of the causes of shut-down at the Trenton filter plant, which disclosed that they resulted mainly from very black water from the Lehigh River. When there was a sufficiently large volume of water coming down the Delaware above the mouth of the Lehigh the black water was diluted and the Trenton filter plant was able to operate. He never heard of a shut-down being due to anything but black water and phenols (R. 4467). His studies indicated that these shut-downs occurred after a sudden increase of flow in the Lehigh River following a more or less prolonged period of lower flow (R. 4468).

Mr. Johnson, engineer of the Burlington Water Plant, testified that the city obtains its water from the Delaware River and that conditions of odor and taste have occurred since he has been at the plant, at least five times during each season. They occur mostly in the winter, principally in November. (R. 1300). They received complaints and they called upon the New Jersey State Board of Health, which made an investigation and report (R. 1301). It was a disagreeable medicinal taste like that of coal tar (R. 1301-1302).

Mr. Foreman, chemist of the Bureau of Engineering, of the State Department of Health, testified that he received complaints of taste and odor in Burlington water frequently during the fall and winter months. Last fall he went to Burlington and investigated the matter and suggested some method of treatment. Samples collected and analyzed showed the presence of phenol to the extent of .2 parts per million. He has also observed phenol taste in the water at Trenton (R. 1297). Mr. Sleeper, president of the Board of Water Commissioners for the past four years, and a member of the Board for 13 years, testified that the Burlington water has had an objectionable taste at some time during every year since he has had anything to do with the plant. It usually occurs in the winter time (R. 1298). Burlington has a population of 13,000. It is located on the bank of the river and takes a little over a million gallons per day. The city has owned the plant since March 25, 1877, and it was operated prior to that time by private parties. The city has no storage except a standpipe holding 280,000 gallons, which is sufficient for a quarter of a day's supply (R. 1298). The phenol taste occurs on an average of ten or fifteen times a year during the winter months. At the suggestion of the State Board of Health they have installed machinery to remove this taste, but the operation is only experimental and definite results have not yet been obtained (R.

1299). The city water is treated by coalgulation to remove sediment and by the use of rapid sand filters and chlorination.

Although no records have been kept by the Burlington plant of taste and odor difficulties, the tastes appear when the river was frozen over or in break-ups of the river immediately after having been frozen over (R. 1298). The water is now treated with ammonia gas to assist in the removal of tastes and odors from phenol-like materials (R. 1299).

Exhibit No. 185 shows the average number of B. coli per c. c. at the Trenton water intake for the years 1921 to 1929 inclusive. They are for the raw Delaware River water at the Trenton intake before any treatments (R. 1199).

In Exhibit No. 186, curves are presented to show the effect of diversions of 600 and 800 million gallons per day of the B. coli concentrations of the Delaware River water at the Trenton water intake (R. 1200).

The plan of diversion will increase the frequency, and probably the intensity, of the shut-downs at Trenton and at Burlington. There are relatively few instances in which the flows at Trenton on the dates of shut-downs would have been materially increased under the New York plan. Increased concentration of objectionable materials, therefore, is likely to occur at Burlington and Trenton (R. 1464).

In addition, the ratios of the flows of the Lehigh River to the Delaware on a number of the days of shut-down would be disturbed by the New York plan in the direction of disadvantage. Inasmuch as the New York plan contemplates no let-downs, particularly during the winter periods, and the abstractions of the Delaware River water would occur when the Lehigh River was high, the resulting effects at Trenton and Burlington would be disadvantageous (R. 1464).

The evidence shows that interference with the operation of the water treatment plants at Phillipsburg, Trenton and Burlington, New Jersey, will be increased in frequency and intensity through the operation of the New York plan, due to abstractions of water of superior quality from the Delaware River above the confluence of the Lehigh River.

(d)

Agriculture

The defendants except to the conclusion of the Master that the effect of the diversion on agriculture and the cultivation of New Jersey lands bordering on the river will be "slight and immaterial," on the ground that a finding of "even" slight damage is not supported by the weight of the evidence.

The testimony in behalf of the plaintiff on this subject was given by men of wide experience. Attention may first be called to the exhibits which illustrate this testimony, to wit:

Exhibit 235 is a map showing the locations of the tracts which were selected for a study of the effect of changes in the stage of the river. Exhibit 236 is a series of photographs of some of the lands included in Exhibit 235. Exhibit 237 consists of the field notes of the witness. Exhibit 238 is a table and profile of ground water levels, showing that the ground water level in all the wells where the experiments were conducted rose relatively as the river rose. Exhibit 239 is a profile along the line of certain test wells. Exhibits 241 and 242 show the development of corn and wheat indicating a penetration by the roots of from five to seven feet.

The plaintiff's contention that the lowering of the waters of the Delaware River a few inches would seriously injure

the agricultural value of these lands may be summed up as follows:

1. The rain-water falling upon these lands and the surface flow from the adjacent higher lands readily penetrates through these open soils to the ground water level.

2. The ground waters from the adjacent higher lands supplement the ground water in these tracts on its course to the Delaware River.

3. The average ground water level in these lands is at a higher elevation than the adjacent river water to the extent that the texture of the soil offers resistance to the under ground flow.

4. The water stage in the river determines the ground water level.

5. Water levels in the river sometimes reach higher elevations than the adjacent ground water, and during such periods seepage from the river raises the ground water and adds to its volume.

6. Long periods of high or low water in the river produce relatively high or low ground water in these agricultural lands.

7. Corn, wheat and alfalfa and the truck garden crops develop root systems in this type of soil with a working depth of from 3 feet to 12 feet (R. 2004-2007).

8. The ground water table on the Weiner Farm, Tract No. 3, during the dry summer conditions of 1929, were 10 feet to 15 feet below the surface, and in the unusually dry spring of 1930 from 4 feet to 14 feet below the surface.

9. An adequate water supply is necessary to the growth of any crop and ground water must be relied upon to supplement rainfall.

10. The capillary rise above the water table is from 2 feet to 5 feet (R. 1985).

11. With the root zone average working depth of 7½ feet and an average capillary rise of 3½ feet, a total of 11 feet, the water table is well within reach of the plant in the early summer and in large part throughout the entire growing season.

12. The top soil is underlaid with coarser material, sand and below that gravel (R. 1970). The water holding capacity of the finer soil is greater than in coarser material. Capillary rise in gravel is nil, in coarse sand only a few inches and in clay it is several feet (R. 1971). When the water table drops below the dividing line between a coarser and finer materials the capillary connection is broken.

13. The ground water in these lands rises and falls, following the river level (R. 1969). The dividing planes between the finer upper soil and the coarser sub-soil are at varying depths, thus the effect of lowering the river would be to break the capillary contact between the coarser sub-soil and finer soil above in some areas of these lands at an ordinary stage of the river.

14. This breaking of the capillary rise would deprive the root zone of the ground water supply, and since these lands are overdrained and the rainfall is inadequate for an optimum growth, the crops would suffer by reason of the reduction of the stage of the water in the Delaware River which would result from the proposed diversion.

Following is a summary of the testimony in support of these claims:

Mr. Harman, a civil engineer who has specialized in farm drainage for forty years and has constructed drainage ditches, etc., in the States of Illinois, Wisconsin, Iowa, Missouri, Indiana, Tennessee, Arkansas, Louisiana, Texas,

Mississippi and Florida, made an examination of the land and prepared Exhibit 235; all the land therein represented ranges in elevation from 10 to 30 feet above the water level of the river.

The soil of the islands and of the first terrace is classified by the United States Bureau of Soils under the "Chenango Soil Series." The material is alluvial deposit consisting of irregular layers or lenses of silt or sand and gravel, above the bed rock. The top soil (light brown in color) varies in depth from a few inches to fifteen feet or more, is free from stone, which makes it easy to cultivate, and ranges from silt loam through sandy loam, with small areas of sand all underlaid with sand or gravel.

The 26 tracts of first bench or terrace land, shown on Exhibit 235, aggregate 3650 acres. These lands are of a sandy type, underlaid with coarser sand and gravel, and drain readily to the river; in fact, they are overdrained (R. 1961). Water in the farm wells on the first terrace lands is from a few inches to a few feet above the water of the river and rises and falls following the river. Test wells were put down on Tract No. 3 on the New Jersey side, opposite Milford, Pennsylvania (R. 1961). Daily readings were taken of the water level in these wells from June, 1929, to the end of March, 1930.

He made further examinations of the soils on these lands in March and April, 1930, and observed particularly that there was considerably more moisture in the upper layers of finer soil than in the under layers of coarser material. Rain-water readily penetrates the soil and drains downward to the water table, and the water in the wells is held back by the water in the river (R. 1962).

He observed that where there were areas of very sandy soil the vegetation was sparse, illustrating the overdrained condition, and that any lowering of the water table would injuriously affect some portions of these areas. The water

table is near enough to the surface to provide capillary water to the plant root zone and to provide the plant with moisture in seasons of deficient local rainfall (R. 1977). These first terrace lands have a better agricultural value because the water table is maintained nearer the surface than in the same types of land situated farther away from the river or at a higher level. There is a direct relationship between the water level of the river and crop production on this type of land along the Delaware River. He considered that the Delaware River would be lowered by the proposed diversion as much as 8 or 9 inches in the late winter or early spring and summer months when the ground water would ordinarily be raised and held back to that extent. The growing season begins in May and extends through June and the summer months. The lowering of the water from one and one-quarter to two and five-eighths inches could change the condition from a water supply to no water supply by breaking the capillary continuity of flow from the coarse to the fine material above (R. 1977).

Extensive experiments show that the water will rise by capillarity in clay soil as much as ten feet above the source of water supply, and a very substantial amount of flow at six and eight feet above the supply. Some experiments indicate capillary rises of as much as 25 or 30 feet, but the practical limit seems to be under 10 feet. In some of these soils the water will rise 4 or 5 feet by capillarity, and in much of the area it would average from 2 feet to 3 feet. He had the report of the United States Department of Agriculture Soil Surveys of the Delaware River valley when he made his investigations in November, 1929 (R. 1985).

The high waters of the winter and spring have a direct value to the agriculture on the first terrace lands and the summer rises give some advantage to the land that lie close to the river. If there is not sufficient moisture for

germination and growth in the months of May and June the season will be too short for proper growth of a normal or abundant crop, even with plenty of moisture thereafter. The roots require several weeks to reach their full growth. Most crops reach their maturity in July or August. A let-down of water during August and September would be of little value to most of the crops produced in that valley. Frosts occur in late September or early in October and there is then no crop growth until the next planting season in the spring (R. 1986).

Dr. John W. Shive, Professor of Botany and Plant Physiology at Rutgers University, testified that: All vital processes of the plant growth take place in water, and the plant will be killed or driven into dormancy if the water supply is withheld (R. 2003). The working depth of the root systems of field crops and truck crops is from 3 feet to 12 feet or more in open soils, such as in the Delaware Valley (R. 2007). The working depth of field corn is from 5 to 8 feet, wheat 5 to 7, rhubarb 8 feet, beets 10 to 11 feet, alfalfa 10 to 20 feet. There are two sources of water supply for plants—rain that falls on the surface and percolates through the soil, and water drawn from the water table (R. 2007). In the Delaware River lands the plants draw water from the water table (R. 2008). When the water table recedes and the roots extend deeper to reach the water, the production of fruit or top growth will be reduced, and lowering the ground water will have the effect of reducing crop production (R. 2009).

Dr. Jacob G. Lipman, Dean of the College of Agriculture, Professor of Agriculture at Rutgers University, and Director of the New Jersey Agriculture Experiment Station (since 1898) testified that:

The amount of water stored in the soil at the beginning of the growing season must supplement in a very important way the current rainfall during the growing season, and if the water stored in the soil is reduced, the

rainfall might not be sufficient for the production of a satisfactory crop (R. 2029). If the water supply is below the critical point the plant will wilt, growth will stop and the plant will not come to fruit during the growing season. The high waters of the spring and early summer are of direct benefit to agricultural lands along the shores of the Delaware River because thereby the storage holding capacity of the soil is increased (R. 2029).

The planting and growing season begins in April and for most crops the growing season closes in June and July, but corn, pasturage and some other crops continue to grow through August and September. Killing frosts occur about the first of October. The letting down of storage waters during July, August, September and October would be after the close of the growing season of most of the crops (R. 2032).

Crop yields in New Jersey and the world over are determined in greater measure by the water supply than any other factor for any given climatic zone (R. 2034). Reducing the stage of the Delaware River, as would result from the diversion proposed by New York, would influence adversely the agricultural development of the Delaware River Valley lands, which are suitable for the growing of market garden crops (R. 2035).

Dr. Linwood L. Lee, research specialist in soil utilization at the New Jersey Agricultural Experiment Station, and Professor of Soils at the New Jersey Agricultural College, testified that since 1919 he has been in charge of the soil survey work of the Agricultural Experiment Station, in co-operation with the United States Department of Agriculture (R. 1990-1991). He has made soil classifications in nearly every state in the United States and in British Columbia, Alberta, Saskatchewan and Manitoba. He has worked out a soil classification and made studies of land utilization for the British Government in England, Scotland and Wales (R. 1992).

He has personally classified much of the soil in the Delaware River Valley (R. 1993) and published reports thereon. The soils adjacent to the Delaware River have greater economic value than soils located further back from the river and therefore have a higher crop value and are adapted to the production of intensified crops. In New Jersey the average value of the intensified crops for the past nine years was $225 per acre; unintensified crops about $25 per acre; and wild hay $18 per acre (R. 1994).

The soils of the Delaware River Valley (R. 1995) are classified in the Chenango series. They vary considerably in texture and rain water percolates through them very rapidly to the ground water level. These soils always contain gravel layers occurring from three to twenty feet below the surface. Above the gravel layers the soil is heavier but variable in texture (R. 1995). The gravel layer is very important in the capillary movement of water in these soils, since capillary water will rise in fine materials but not in gravel. In these soils of the Delaware River Valley the rise of capillary water is from zero to three or four feet; there being no rise when the water encounters gravel (R. 1996). The ground water level varies from three or four feet, to twenty feet below the surface and rises and falls with the river. The moisture available for crops is affected by the height of the water table. When the water table is high it is available to crops and when low it is unavailable. Gravel layers play a very important part for when the ground water level is above the gravel layer there can be a capillary rise of water and when it is in or below the gravel layer, there can be no rise of capillary water. A fall of only an inch or a fractional part of an inch in the ground water level therefore may destroy the capillary rise (A. 1997).

The Delaware Valley soils are especially adapted to intensified crops (R. 1998). If water is taken from the river by New York the water table would be lowered to an

extent that intensified crops could not be grown. Less intensified crops or wild hay would therefore be produced, greatly lessening the agricultural returns from the land. This land is potentially 100% intensified cropping land, as it will grow those crops to better economic advantage than any other type of crops. The recent improvement in roads has increased the value of this land for intensified crops (R. 1998).

Some testimony was offered in behalf of the defendant City in contradiction to the views of the plaintiff's witnesses. The principal witness was Dr. Ora S. Morgan, Professor of Agriculture of Columbia University, who gave his opinion that the proposed diversion would have practically no effect on the agricultural value of the lands in question; this conclusion, however, was based upon his opinion that the moisture in these lands came from the overflow or from rainfall or melting snow, instead of from the ground water. He overlooked the fact that the ground water level was higher or lower as the river was higher or lower.

Mr. McManus expressed the opinion that the New York plan would not affect the ground water level (R. 2826). But his testimony is discounted by the failure to disclose any qualifications on the subject of agriculture.

Professor Berkey, an eminent geologist, testified that there would be no measurable effect on the moisture in lands from the New York plan, as these lands are watered directly by rainfall; but his conclusion that the height of the river does not affect the lands ignored the well-recognized fact that the ground water in its flow to the river develops steep slopes and the finer the material the steeper the slope of the ground water (R. 4152).

Mr. Arthur E. Morgan, on behalf of the intervener, also expressed the opinion that the crops obtain their water from rainfall and not from ground water or from the

river. He showed no qualification concerning agriculture, or any knowledge of the nature of the Delaware River bottom lands. His conclusion as to the effect of capillary rise is based upon an erroneous interpretation of Mr. Harman's testimony, namely, that there would be only one foot of capillary rise and that the effect of that one foot of rise would apply only to a zone or area equivalent to a change of elevation in the surface of the land of one foot at the elevation of the ground water. This assumption is not in accordance with the testimony of Mr. Harman to the effect that in these soils the capillary rise is from 2 feet to 5 feet, depending upon the fineness of the soil.

In support of the testimony of the plaintiff's experts, we have the testimony of men who have for years tilled the soil on areas of land included in Exhibit 235.

Smith Stackhouse has for ten years farmed 80 acres of land along the river in Tract No. 13 (Exhibit 235). He testified that low water in the river produces a shortage of one-third or more in crops on his land along the river (R. 1748). If the river is high, it means a big difference in the crops. He raises corn, wheat, potatoes, oats, hay and pasture. He owns almost a mile along the river. High water improves the quality and quantity of the crops (R. 1749). The river bank is about 15 feet high on his land (R. 1750). The lower the river is the more the land dries out. It shows in the crops. Local rains help moisten the ground, but if the river is low, it will soon soak away (R. 1750).

John M. Bevens has lived in the neighborhood of the Delaware River all his life and owns 180 acres along the Delaware River in Tract 9 on Exhibit 235. He rents additional land in the same locality, which is Tract 7 on that exhibit (R. 3986). He is familiar also with Tract 11. Tract 7 has been farmed by his grandfather, uncle and

himself (R. 3987). He is familiar with nearly all the land along the river in that section and has been a farmer all his days, and has always been familiar with the farming of that land (R. 3988). A low river always affects the crops, as they do not start so well. That was his experience this year (R. 3988). The soil is sandy ground and heavy loam. Growing conditions this year were very poor. Corn would not start and he did not have a crop. In other years when water conditions are different in the river he has a splendid growth. Crops start and grow so that he can hardly keep up the cultivation with the crop. When they have a full river with plenty of water in it, their crops show a much better growth (R. 3989). High water in the spring or early summer makes the crops better. Ordinarily his land produces very good crops—100 bushels of corn to the acre and considerably better some years. High waters in the summer from summer rains also benefit the land (R. 3990).

The experience of these two farmers demonstrates the accuracy of the testimony of the plaintiff's experts with respect to the character of the soil, the relationship of water levels in the river to ground water levels in the soil, and the direct effect of water levels in the river upon the crop production.

The average monthly stage of the Delaware River will be reduced up to 8 inches by the diversion of 600 m. g. d. as proposed by the City of New York. The reduction of the flood stages will be considerably more than the monthly average. These reductions in Delaware River stages will occur generally in the late winter, spring and early summer months when the crops most need the water.

It is submitted that the testimony shows that the agricultural lands in New Jersey will be substantially damaged by the proposed diversion by reason of the loss of the higher waters in the river during the winter and early spring and of the summer rises, which now naturally occur,

and that if all, or substantially all, of the run-off of the diversion area, with the exception of the proposed reserve flows, are diverted from the river above the New Jersey State Line substantial agricultural damage and a serious detriment to development to these river bottom lands of New Jersey will result.

III.

The decree should be final.

The City of New York urges that the Special Master erred in recommending that the decree be not final (Point IV, p. 37).

The State of New York urges that "the decree should be final and not subject to modification" (Point V. p. 32).

The plaintiff agrees that it is desirable that the "litigation should be ended." But the important question, of course, is the terms upon which it shall be ended.

Interest reipublicae ut sit finis litium.

CONCLUSION.

While plaintiff believes that the damage to recreation and to the oyster industry are even greater than the Master found, his conclusions that substantial damage would result thereto are amply justified by the weight of the evidence. Likewise, with respect to sanitation, shad fisheries, water supply, and agriculture (and also navigation, water power and industrial uses, discussed in our main brief), while plaintiff believes that the proof shows substantial damage to each item, in any event, the proof is ample to sustain the Master's findings of "slight" damage to each of them.

On the whole case plaintiff submits that it is entitled to a decree for injunction as prayed in the complaint.

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IN THE

Supreme Court of the United States

OCTOBER TERM, [redacted]
ORIGINAL NO. [redacted] 5

STATE OF NEW JERSEY,

Plaintiff,

against

STATE OF NEW YORK and THE CITY OF NEW YORK,

Defendants,

and

COMMONWEALTH OF PENNSYLVANIA,

Intervenor.

BRIEF OF THE DEFENDANT, STATE OF NEW YORK, IN REPLY TO BRIEF OF PLAINTIFF, NEW JERSEY, ON ITS EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER.

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BATAVIA TIMES, LAW PRINTERS,
BATAVIA, N. Y.

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IN THE

Supreme Court of the United States

STATE OF NEW JERSEY, Plaintiff, *against* STATE OF NEW YORK and THE CITY OF NEW YORK, Defendants, *and* COMMONWEALTH OF PENNSYLVANIA, Intervenor.	OCTOBER TERM, 1930. ORIGINAL. No. 16.

BRIEF OF THE DEFENDANT, STATE OF NEW YORK, IN REPLY TO BRIEF OF PLAINTIFF, NEW JERSEY, ON ITS EXCEPTIONS TO THE REPORT OF THE SPECIAL MASTER.

POINT I.

Riparian Rights under Common Law do not control.

Plaintiff has based many of its exceptions and its first Point upon the theory that the common law rule of riparian rights is the sole rule applicable to this case. It has endeavored to point out in some detail that this Court decided the cases of *Kansas v. Colorado,* 185 U. S. 125; 206 U. S. 46; *Wyoming v. Colorado,* 259 U. S. 419; *Wisconsin v. Illinois,* 278 U. S. 367; *Connecticut v. Massachusetts,* decided

February 24, 1931 (9 Adv. Op. 297, 1930 Term), according to the strict common law doctrine of riparian rights or the appropriation doctrine, or because plaintiff "had not shown itself entitled to injunctive relief."

This defendant in its brief in support of its own exceptions did not deem it necessary to discuss this question of law in detail in view of the recent decision of Connecticut v. Massachusetts. In view of plaintiff's emphasis, however, some discussion will here be made on that point.

In *Connecticut v. Massachusetts* the Court said as to this:

> "Connecticut suggests that, under *the common law* in force in both States, each *riparian owner* has a vested right in the use of the flowing waters and is entitled to have them to flow as they were wont, unimpaired as to quantity and uncontaminated as to quality. It maintains that the taking of waters from the Ware and Swift infringes vested property rights in that State which cannot be taken without its consent against the will of the owners. And it insists that this Court, following the law enforced by each of the States within its own boundaries, should grant injunction against any diversion from the watersheds of these rivers.
>
> *But the laws in respect of riparian rights that happen to be effective for the time being in both States do not necessarily constitute a dependable guide or just basis for the decision of controversies such as that here presented.* The rules of the common law on that subject do not obtain in all the States of the Union, and there are variations in their application. The doctrine of appropriation prevails in some States. And every

State is free to change its laws governing riparian ownership and to permit the appropriation of flowing waters for such purposes as it may deem wise. *United States v. Rio Grande Irrigation Co.*, 174 U. S. 690, 702.

For the decision of suits between States, *federal, state* and *international law* are considered and applied by this Court as the exigencies of the particular case may require. The determination of the relative rights of contending States in respect of the use of streams flowing through them does not depend upon the same considerations and is not governed by the same rules of law that are applied in such States for the solution of similar questions of private right. *Kansas v. Colorado*, 185 U. S. 125, 146. And, while the *municipal law* relating to like questions between individuals is to be taken into account, it is not to be deemed to have controlling weight. As was shown in *Kansas v. Colorado*, 206 U. S. 46, 100, such disputes are to be settled on the basis of *equality of right*. But this is not to say that there must be an equal division of the waters of an interstate stream among the States through which it flows. It means that the principles of right and equity shall be applied having regard to the 'equal level or plane on which all the States stand, in point of power and right, under our constitutional system' and that, upon a consideration of the pertinent laws of the contending States and all other relevant facts, this Court will determine what is an equitable apportionment of the use of such waters. *Wyoming v. Colorado*, 259 U. S. 419, 465, 470.

The development of what Mr. Justice Brewer, speaking for the Court in *Kansas v. Colorado*, 206 U. S. 46, 98, refers to as *interstate common law* is indicated and its application for the ascertainment of the rela-

tive rights of States in respect of interstate waters is illustrated by *Missouri v. Illinois,* 200 U. S. 496; *Kansas v. Colorado, supra; Wyoming v. Colorado, supra,* and *Wisconsin v. Illinois,* 278 U. S. 367; 281 U. S. 179. Two of these cases are much like the one at bar.

* * * * * *

It is very clear that, under earlier decisions here, *the strict rules* for which Connecticut contends are not necessarily controlling in this case.

* * * * * *

Drinking and other domestic purposes are the highest uses of water. An ample supply of wholesome water is essential." (Italics ours.)

In *Kansas v. Colorado,* 185 U. S. 125 at 146, 147, Mr. Chief Justice Fuller said:

"Sitting, as it were, as an international, as well as a domestic tribunal, we apply Federal law, state law, and international law, as the exigencies of the particular case may demand, and we are unwilling, in this case to proceed on the mere technical admissions made by the demurrer."

In *Missouri v, Illinois,* 200 U. S. 496, 519-520, Mr. Justice Holmes said:

"But the words of the Constitution would be a narrow ground upon which to construct and apply to the relations between States the same system of municipal law in all its details which would be applied between individuals."

Principles of International Law Support the Proposed Diversion.

Most of the international law concerning international rivers has been embodied in treaties rather than Court de-

cisions and has considered navigation rather than other uses. There are, however, a few passing references to other uses. John Quincy Adams, as Secretary of State and later as President, negotiated with Great Britain in an endeavor to open the St. Lawrence River to navigation by the United States. In stating the views of this country he said, among other things:

> "A nation deprived of the use of the water flowing through its soil would see itself stripped of many of its most beneficial uses of the soil itself; so that its right to use the water and freely to pass over it becomes an indispensable adjunct to its territorial rights."

5 Am. State Papers, Foreign Relations 519-579, at 571.

In 1884, an international conference was held at Berlin to consider the proposed freedom of commerce and free navigation of the Congo and its tributary rivers in Africa. Prince von Bismarck, in opening this conference and stating its purposes, said:

> "The Congress of Vienna, in proclaiming freedom of navigation on the rivers which flowed through the territories of several states, sought to prevent any monopoly of the advantages inherent in a water cause. This principle has passed into public law, both in Europe and America."

House Exec. Doc., 48th Cong. Second Session, Volume 29, No. 247.

In connection with the case of *United States v. Rio Grande Dam & Irrigation Co.*, 174 U. S. 690, it should be noted that in 1906, Secretary of State Elihu Root negotiated a treaty between the United States and Mexico apportioning the waters of the Rio Grande between the two nations on an equitable basis, the larger share to the United States,

partly in consideration of its agreement to release into the river at a certain point a definite quantity of water (60,000 acre feet of water annually) according to a detailed schedule. (34 Stat. at L., 2953.) Negotiations are now contemplated looking toward the equitable use of the waters of the Rio Grande at another point in its course. The Act of May 13, 1924 (43 Stat. at L., 118) is entitled:

> "An Act providing for a study regarding the equitable use of the waters of the Rio Grande below Fort Quitman, Texas, in cooperation with the United States and Mexico."

In 1909, Mr. Elihu Root and Mr. James Brice negotiated a treaty establishing an International Joint Commission with jurisdiction over all of the rivers and lakes on 2195 miles of boundary line between the United States and Canada (36 Stat. at L., 2448). Article VI of this treaty provided that the St. Mary and Milk Rivers (flowing in opposite directions across the boundary) should be treated as one stream for the purposes of diversion by both parties for irrigation and power. Article VIII establishes an order of precedence to be observed among the various uses of water, as follows:

(1) Uses for domestic and sanitary purposes;
(2) Uses for navigation including the services of the canals for purposes of navigation;
(3) Uses for power and irrigation purposes.

The Swiss Federal Tribunal has twice held that it had jurisdiction of suits between cantons in which a lower riparian Canton sought to restrain an upper riparian Canton from interfering in any way with the natural flow of the common stream. In each case it dismissed the complaints upon the ground that equality between the cantons

did not forbid common use of the waters and did not require undiminished or unterrupted flow.

Der Regierung des Kantons Aargau und Konsorten. Entscheidungen des Schweizerischen Bundesgerichtes, IV, 34.

Aargau gegen Solothurn. Entscheidungen des Schweizerischen Bundesgerichtes, VIII, 689.

The plaintiff has cited in its brief, at pages 42 and 43, an article in 36 *Harvard Law Review,* 960, as authority for the list of states in which the appropriation doctrine prevails. Other quotations from the same article are, at p. 975:

> "In a federal Union composed of states of equal rank, it does not appeal to our sense of justice that a lower state upon an interstate stream should be permitted to have all of the flow of the stream come down to it undiminished by water uses in the upper state, or that an upper state should be permitted on any theory of political power whatsoever, to hold back all the waters arising within its boundaries. Our sense of justice seems to tell us that in such a Union of states, an interstate stream, being a common supply by nature, ought to be a common supply by interstate law. *Kansas v. Colorado* repudiated the contention of exclusive right on the part of the lower state, and both *Kansas v. Colorado* and *Wyoming v. Colorado* repudiated the contention of exclusive right on the part of the upper state. * * * Again, if the rule of equitable division be the rule as between an appropriation state and a riparian state, *a fortiori* would it be the rule as between two riparian states, withdrawing water for beneficial purposes."

and at 979:

> "The instances of international practice in respect to the withdrawal of water from international streams for beneficial use are very few, but such as they are, it is to be noted that the treaties do not divide the water regardless of international boundaries and in accordance with the seniority of water uses in the two nations considered as if they were one, but simply effect a division of a part of the water to one nation and of a part to the other."

Mr. H. A. Smith of the University of London, in VIII *Canadian Bar Review*, 330 at 339-340 says:

> "Upon the whole problem authority is not very plentiful, but its tendency is unmistakable. Substantially it consists of the treaty provisions, now fairly numerous, and the German and American decisions cited above. The analogy of private law, in so far as it is relevant, points in the same direction. Practical convenience and common sense unite with authority to condemn the doctrine laid down by Mr. Harmon in 1895, that territorial sovereignty permits a State to do as it likes with waters in its own territory irrespective of any injury it may cause to its neighbours. On the other hand, it is clear that international practice will not support the extreme assertion of riparian rights that is possible under the strict rules of private law. The Roman and English rules upon the subject were developed long before the scientific exploitation of water systems could be foreseen, and even within the limits of municipal law their strict application can work serious injustice. In practice it has been necessary to override them by public rights of expropriation in order to provide for such communal necessities as

water supply and drainage. The same principle of the paramount right of the large community holds good also in international law, but international agreement must take the place of the superior common authority which is lacking in international relations. Any particular river system must be viewed as a whole and its benefits distributed in equitable proportions among the riparian States. This is the principle underlying the German and American decisions, and it is also the dominant note of the treaty provisions. It means in effect that no State is bound to submit to injury inflicted by the unilateral action of another, while on the other hand a State would be guility of an unfriendly act in refusing its assent to a reasonable scheme of common exploitation. The circumstances of every individual case will vary greatly, and probably it is not possible for international law to lay down rules in any more precise detail."

Riparian Doctrine in New Jersey.

New Jersey permits diversion for municipal water supply, navigation and manufacturing.

In *McCarter, Attorney General v. Hudson County Water Co.*, 70 N. J. Eq. 695, Mr. Justice Pitney said at pages 715-716:

"As we have just pointed out, it is, and long has been the legislative policy of this state, while recognizing fully the common law right of diversion on the part of riparian owners, to allow no statutory extension of this right, nor to authorize water diversion for other than riparian uses, saving for a limited class of purposes beneficial to the people of this state, such as

the establishment of water powers for manufacturing purposes, the construction of artificial channels for navigation, and the supply of our own inhabitants with water through aqueducts."

and at 701:

"It must, we think, be sufficiently obvious that the government established in this state by and for the people thereof has complete dominion (subject only to constitutional limitations) over all things within the borders of the state, including all lands and waters, and the mode of acquiring and disposing of rights of property therein. The fresh water lakes, ponds, brooks and rivers, and the waters flowing therein, constitute an important part of the natural advantages of this territory, upon the faith of which its population has multiplied in numbers and increased in material and moral welfare. The regulation of the use and disposition of such waters, therefore, if it be within the power of the state, is among the most important objects of the government."

When that case came before this Court (209 U. S. 349), Mr. Justice Holmes said in part at page 356:

"The problems of irrigation have no place here. Leaving them on one side, it appears to us that few public interests are more obvious, indisputable, and independent of particular theory than the interest of the public of a state to maintain the rivers that are wholly within it substantially undiminished, except by such drafts upon them as the guardian of the public welfare may permit for the purpose of turning them to a more perfect use. This public interest is omnipresent wherever there is a state, and grows more pressing as population grows. It is fundamental, and

we are of opinion that the private property of riparian proprietors cannot be supposed to have deeper roots. Whether it be said that such an interest justifies the cutting down by statute, without compensation, in the exercise of the police power, of what otherwise would be private rights of property, or that, apart from statute, those rights do not go to the height of what the defendant seeks to do, the result is the same."

Thereafter (1907), the State Water Supply Commission Act was passed, and it was construed in *Collingswood v. Water Supply Commission*, 84 N. J. Law 104 (1913). At p. 111, it was said:

"The general effect of this legislation is to invest the commission as a state agency with the fullest control over prospective drafts by municipalities, corporations, or private persons upon either surface or subsurface supplies of water within the jurisdiction and boundaries of the state; to charge it as such agency with the duty of prudently and economically dealing with the supply so as best to subserve the interests of the people of the state at large and not the interests of any particular locality; and to vest in the commission a judicial discretion with regard to permitting municipalities to draw upon that water-supply, such discretion to be exercised within the limits laid down by the statute and subject to review by the Courts 'for reasonableness, legality and form.'"

The case of *Patterson v. East Jersey Water Co.*, 74 N. J. Eq. 49 (1908), is not exactly in point, in view of the fact that the defendant company was a private corporation, without power of eminent domain, engaged in the business of supplying municipalities with water at a profit

to itself, but not charged with the duty to supply such water. The Court at p. 82 said:

> "This claim, if sustained, placed the riparian owner's right of permanent diversion *for sale* upon the same basis as his right to use the flow for extraordinary purposes upon or in connection with the riparian lands, viz., manufacturing, irrigation, and the like." (Italics ours.)

Riparian Doctrine in New York.

This subject was discussed by the Special Master (Rep. Sp. M. 17 through 22) and this defendant's brief (pp. 8 and 9).

In discussing reasonable use by riparian owners, the Court of Appeals in *Strobel v. Kerr Salt Co.*, 164 N. Y. 303, at 320, said:

> "Surrounding circumstances, such as the size and velocity of the stream, the usage of the country, the extent of the injury, convenience in doing business and the indispensable public necessity of cities and villages for draining, are also taken into consideration, so that a use which, under certain circumstances, is held reasonable, under different circumstances would be held unreasonable."

Even where a municipality does not exercise its statutory powers to condemn in connection with its municipal water supply, a lower riparian owner who can not show damage will not be granted an injunction.

Lyon v. Water Commissioners of Binghamton, 228 App. Div. 585.

See also:

McCann v. Chasm Power Co., 211 N. Y. 301-306.

Riparian rights may be condemned for river improvement and river regulation. L. 1911 Ch. 647 *(Conservation Law,* Secs. 412 through 447).

State Water Supply Commission v. Curtiss, 192 N. Y. 319.

Board of Hudson River Regulating District, 249 N. Y. 445.

Riparian Doctrine in Pennsylvania.

This Court in *Rundle v. Delaware & Raritan Canal Co.*, 55 U. S. 79, at 94, indicated that either New Jersey or Pennsylvania might divert the water of the river for public improvements but that it was unnecessary in that case to decide their right to do so without the consent of the other. Existing and extensive diversions by both parties for canal purposes were involved but the plaintiff, a Pennsylvania riparian owner, was held not entitled to raise the question, because he could not have done so under Pennsylvania law.

The Pennsylvania law considers domestic supply the highest use of water, but considers some industrial uses as public uses, and where a watershed becomes a competitive area between rival claimants for its development for public use priority is given to the first in time to the extent of its present and reasonable future needs.

Palmer Water Co. v. Lehighton Water Co., 280 Pa. 492.

Scranton Gas & Water Co. v. D. L. & W. R. R. Co., 240 Pa. 604.

Boelsburg Water Co. v. State College Water Co., 240 Pa. 198.

POINT II.

No additional legislation by New York was necessary.

At pages 55 and 59 of plaintiff's brief it is urged that the special legislation in Massachusetts specifically authorizing the diversion distinguishes the case of *Connecticut vs. Massachusetts* from the case at bar. But the situation as to the Massachusetts legislation was as follows:

The limit of the power of the Metropolitan District Commission in general charge of the Boston Water Supply will be found in General Laws, Chapter 92, Section 10, and following sections. There is no general power given by the Massachusetts Legislature to any commission, including the Metropolitan District Commission, to make general takings or diversions of water. The Legislature reserves by implication at least complete control over the Massachusetts water supply sources and it has been the practice of the Massachusetts Legislature to authorize each particular project as occasion arises. The only exception to this provision is found in authority given to cities and towns and to the Metropolitan District Commission to take water for emergency purposes under the provisions of General Laws, Chapter 40, Section 40, as amended by statutes 1926, Chapter 318. It was, therefore, necessary for the Massachusetts Legislature to give the Metropolitan District Commission express power to take the waters of the Ware and Swift Rivers and this was done by Statutes 1926, Chapter 375 and Statutes 1927, Chapter 321. It is also significant that special legislation was necessary in Massachusetts for the execution of the Ware-Swift project because there was no available organization in the Metropolitan District Commission for carrying out such a vast

engineering project as was undertaken in the Ware and Swift matter. A special commission, the Metropolitan District Water Supply Commission, was set up for this purpose in the 1926 Act.

The general legislation of New York, reprinted in Exhibit 2, is complete, has been long in force, and makes any further legislation unnecessary. The Water Power and Control Commission has complete authority to authorize any diversion. The New York City Board of Water Supply has ample organization to carry out the project.

Among the various statutes set out in Exhibit 2 see particularly at page 4, section 2 of Chap. 724, Laws of 1905, authorizing the Board of Water Supply of the City of New York to "ascertain what sources exist and are most available, desirable and best for an additional supply of pure and wholesome water for the City of New York", and subsequent sections authorizing the prepartion and carrying out of plans to secure the same.

And at page 55 of Exhibit 2 is set out section 400 of the Conservation Law, (Chap. 242, Laws 1928) subdivision 2, of which reads:

> "2. It shall be the duty of the water power and control commission to continue the investigations heretofore conducted by the conservation commission and the state engineer and the superintendent of public works of the water resources of the state, including the systematic gaging and rainfall and stream flow throughout the state, so as to complete a comprehensive system for the entire state, *for the conservation, development, regulation and use of waters in each of the principal watersheds of the state.*"

POINT III.

Necessity for diversion.

As has been pointed out above, both New Jersey and New York States have enacted comprehensive and detailed legislation to conserve and allocate the water resources within their borders. New York State, in permitting the city to develop the drainage area in question considers first the interest of the state as a whole, and secondly, the separate interest of the city. This Court, in considering the question of necessity, should do likewise and look first at the State and only secondarily at the City. The effect of any plan upon other communities in the State, both as to their own needs for water supply and as to the creation within their midst of large reservoirs and drainage areas, is a matter of great importance. These questions are required to be considered under the law and were considered by the Water Power and Control Commission (Exs. 13 & 14).

So far as finding a source which would not require diversion is concerned, adoption of this policy would impose upon the state an undue restriction in the use of its own water resources. Every stream in the state flows ultimately into an interstate or international stream of water.

Even in *Wisconsin v. Illinois*, 278 U. S. 367, Chicago was permitted to take such water as it might need for its domestic municipal supply from an interstate and international body of water. To grant New Jersey's request for an injunction would be in effect giving New Jersey a right prior to and exclusive of that of the State of New York

over 2389 square miles of territory within the State of New York, so far as its use as a watershed is concerned.

It would seem that, at least prior to establishing its water supply commission, New Jersey did not require its private water companies to use nearby sources. See *Olmsted v. Proprietors of Morris Aqueduct*, 447 N. J. Law 311 (1885). There a private company was formed to supply water to the Town of Morristown, New Jersey. It at first had no power of condemnation. It was later given power to condemn and to take and divert any springs or streams within a certain area and later a general act gave power "to add to and extend their works to such extent as may be necessary to carry out the purpose of its corporation, and for that purpose to take all such lands and divert all such streams of water in the manner hereinbefore provided, as shall be necessary for that purpose." This was a proceeding to condemn a certain spring and brook as an additional source, which spring and brook were outside of the drainage area specified in the earlier act. Of the four grounds of objection raised by the owners to the condemnation proceeding, the second was that the company should first be required to take its additional sources within the area specified in the earlier act. The condemnation was allowed.

The cases sustain the Special Master's interpretation of equality of right as embodied in his Summary Finding and Conclusion 18 on page 202 of his report that the selection of a source of supply by New York State is a matter which concerns the administration of its own internal affairs and should not be curtailed unless wilful, arbitrary, without sound basis, and unreasonably injurious to another state. It is not a question of necessity in the extreme lit-

eral sense of that word. The result of the exercise of discretion on the part of either state will not be reversed unless it be unreasonable.

POINT IV.

The questions here are judicial, not political, and the court in deciding them is not legislating.

At page 62 of plaintiff's brief it is asserted that the regulation of the internal welfare of our cities is a political and not a judicial question. So far as this is an argument that the question here to be decided is a political and not a judicial one, and that this Court is therefore without jurisdiction, it is invalid. Such a contention was made by Mr. Webster on behalf of Massachusetts in its boundary dispute with Rhode Island in 1835 but was held to be invalid.

Rhode Island v. Massachusetts, 12 Pet. 657. At page 737 Mr. Justice Baldwin said:

> "The founders of our government could not but know what has ever been, and is familiar to every statesman and jurist, that all controversies between nations are, in this sense, political, and not judicial, as none but the sovereign can settle them. In the Declaration of Independence, the States assumed their equal station among the powers of the earth, and asserted that they could of right do what other independent States could do—'declare war, make peace, contract alliances'; of consequence to settle their controversies with a foreign power, or among themselves, which no State, and no power could do for them. They did contract an alliance with France in 1778, and with

each other in 1781: the object of both was to defend and secure their asserted rights as States; but they surrendered to Congress, and its appointed Court, the right and power of settling their mutual controversies, thus making them judicial questions, whether they arose on 'boundary, jurisdiction, or any other cause whatever.' There is neither the authority of law or reason for the position, that boundary between nations or States is, in its nature, any more a political question, than any other subject on which they may contend. None can be settled without war or treaty, which is by political power; but under the old and new confederacy they could and can be settled by a Court constituted by themselves, as their own substitutes, authorized to do that for States which States alone could do before. We are thus pointed to the true boundary line between political and judicial power, and questions. A sovereign decides by his own will, which is the supreme law within his own boundary (6 Penters, 714; 9 Peters, 748); a Court, or Judge, decides according to the law prescribed by the sovereign power, and that law is the rule for judgment. The submission by the sovereigns, or States, to a court of law or equity, of a controversy between them, without prescribing any rule of decision, gives power to decide according to the appropriate law of the case. (11 Ves., 294), which depends on the subject matter, the source and nature of the claims of the parties, and the law which governs them. From the time of such submission the question ceases to be a political one, to be decided by the *sic volo, sic jubeo,* of political power; it comes to the Court to be decided by its judgment, legal discretion, and solemn consideration of the rules of law appropriate to its nature as a judicial question,

depending on the exercises of judicial power; as it is bound to act by known and settled principles of national or municipal jurisprudence, as the case requires."

Plaintiff's brief, at page 62, asserts that if this Court decides this and the many cases of similar nature plaintiff claims are sure to follow, it will be *legislating* for and operating a gigantic interstate commerce in municipal water supply. This is in effect an argument that the Court in deciding this case will be performing a legislative and not a judicial function.

As to such an argument this Court said in *Missouri v Illinois*, 200 U. S. 496, at 519:

"The Constitution extends the judicial power of the United States to controversies between two or more States and between a State and citizens of another State, and gives this Court original jurisdiction in cases in which a State shall be a party. Therefore, if one State raises a controversy with another, this Court must determine whether there is any principle of law, and, if any, what, on which the plaintiff can recover. But the fact that this Court must decide does not mean, of course, that it takes the place of a legislature. Some principles it must have power to declare. For instance, when a dispute arises about boundaries, this Court must determine the line, and in doing so must be governed by rules explicitly or implicitly recognized. *Rhode Island v. Massachusetts*, 12 Pet. 657, 737. It must follow and apply those rules, even if legislation of one or both of the States seems to stand in the way. But the words of the Constitution would be a narrow ground upon which to construct and apply to the rela-

tions between States the same system of municipal law in all its details which would be applied between individuals."

POINT V.

Plaintiff's exceptions on navigation and water power are without merit.

Concerning navigation on the Delaware above Trenton, this Court in the year 1852 in the case of *Rundle v. Delaware & Raritan Canal Co.*, 55 U. S. 80, at 91, said:

> "the navigation of the river above tide water, and the rapids at Trenton, is of comparatively trifling importance, being used only at times of the spring freshets, for floating timber down the stream, when the artificial diversions do not affect the navigation."

The New Jersey projects for water power development of the Delaware are all paper plans. The principal one was prepared solely for the purpose of this litigation after it had commenced. The references made in plaintiff's brief to a wartime survey is but a make-weight. The discussion of this point in *New York v. Illinois*, 27 U. S. 488, was as follows:

> "The third paragraph of the bill apparently proceeds on the theory that the diversion may interfere with or prevent the use of the waters of the Niagara and St. Lawrence rivers by the plaintiff state and her citizens for the development of power. But it does not show that there is any present use of the waters for such purpose which is being or will be disturbed, nor that there is any definite project for so using them which is being or will be affected. The waters are international and their use for developing power may require the assent of the Dominion of Canada and the

United States. No consent of either is shown. The suit is one for an injunction, a form of relief which must rest on an actual or presently threatened interference with the rights of another. Plainly no basis for such relief is disclosed in what is said about water power development. At best the paragraph does no more than present abstract questions respecting the right of the plaintiff state and her citizens to use the waters for such purposes in the indefinite future. We are not at liberty to consider abstract questions. *New Jersey v. Sargent,* 269 U. S. 329. So the motion to strike out the paragraph must be sustained. This ruling will be without prejudice, so that the plaintiff state, if later on in a position to do so, may be free to litigate the questions which the paragraph is intended to present."

New Jersey has heretofore unsuccessfully made this theoretical development of the Delaware for water power purposes the basis of a suit in this Court. In *New Jersey v. Sargent,* 269 U. S. 328 at 329, 337, 338, 339, Mr. Van Devanter spoke in part as follows:

"This is a bill in equity brought in this Court by the State of New Jersey against the Attorney General of the United States and the members of the Federal Power Commission, all alleged to be citizens of other states, to obtain a judicial declaration that certain parts of the Act of June 10, 1920, called the Federal Water Power Act (41 Stat. 1063, c. 285) are unconstitutional, in so far as they relate to waters within or bordering on that state, and to enjoin the defendants from taking any steps towards applying or enforcing them in respect of those waters. The defendants respond with a motion to dismiss, on the ground, among others, that the bill does not permit a case or contro-

versy appropriate for the exertion of judicial power, but only an abstract question respecting the relative authority of Congress and the state in dealing with such waters. If this be a proper characterization of the bill the motion to dismiss must prevail, as a reference to prior decisions will show. * * *

"The bill further alleges, in an indefinite way, that 'it is the intention' of the state to utilize the Morris Canal, which it recently has acquired, for 'water power development' and in the 'conservation of potable waters'; that there are 'opportunities' for developing water power at several places along streams which feed the canal and in designated localities along the Delaware river 'where dams could be erected and power developed'; that the state 'contemplates' utilizing these opportunities 'through a state agency or by private enterprise' with a resulting profit to its treasury; that the state has an established policy respecting 'the conversation of potable waters,' which has been put into partial effect 'through its agencies and by private enterprise' by means of reservoirs and waterworks constructed at large cost. * * * These allegations are followed by others, similarly indefinite, to the effect that the challenged provisions of the act, if applied and enforced, will interfere with the state's contemplated development of 'the aforesaid power projects,' will jeopardize its policy respecting the conservation of potable waters, and work serious injury to reservoirs and waterworks constructed and used in that connection, will deprive the state of revenue from the leasing of its submerged lands and from the development and conservation of water resources, and will subject the state and its citizens to onerous restrictions and conditions not required for the protec-

tion or promotion of navigation or of interstate or foreign commerce.

"There is no showing that the state is now engaged or about to engage in any work or operations which the act purports to prohibit or restrict, or that the defendants are interfering or about to interfere with any work or operations in which the state is engaged. * * * The state is merely shown to be contemplating power development and water conservation in the future. There is no showing that it has determined on or is about to proceed with any definite project. Neither is it shown that the defendants are now taking or about to take any definite action respecting waters bordering on or within the state. * * *

"Our conclusion is that the bill cannot be entertained.

"Bill dismissed."

CONCLUSION.

We respectfully submit that the plaintiff's exceptions are without merit, and that the Special Master's report should be modified in accordance with the exceptions and brief of this defendant, and as so modified, confirmed.

Respectfully submitted,

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